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CONVAIR | ASTRONAUTICS

CONVAIR DIVISION OF GENERAL DYNAMICS CORPORATION

Attn: U. Moffatt 12218

REPORT NO. 7A2065

ASTRONAUTICS

PRE-PRODUCTION TEST REPORT

FOR

CABLE, RADIO FREQUENCY,

ALUMINUM JACKETED

SPEC. NO. 27-0604

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REVISIONS

NO.	DATE	BY	CHANGE	PAGES AFFECTED

/le

FORM NO. A-788-1

DEVIATIONS

Due to test equipment limitations change para. 4.1.8.3.3, to read:

With a 60 cycle AC voltage applied to the test specimen, measure the Corona extinction voltage with the Biddle Model 1 Corona tester. Apply 10,000 V RMS, 60 cps, to the test specimen for a period of one minute. Monitor the test specimen with the Biddle Model 1 Corona tester for Corona breakdown.

The type "N" connectors shall be removed and the aluminum jacket shall be cut off one inch from the end of the teflon dielectric for this test.

Para 2.3.9	Delete last line - See Para 4.1.10.7
Para 4.1.10.7	Delete entire paragraph
Figure 3	Delete Figure 3
Para 4.9	Last line: The vibration test jig is shown in Figure 3.

Due to test procedure accuracy limitations change para 2.3.5 to read:

IMPEDANCE, The characteristic impedance of the unit shall be 50 ±3Ω.

SUMMARY AND CONCLUSIONS

OBJECT - The object of this test was to obtain data for the pre-production qualification of two types of aluminum jacketed radio frequency cable: (1) Amphenol type No. 421-608, and (2) Raytherm type No. 10-87A.

TEST PROCEDURE - Full test procedures and test results are contained in this report.

SUMMARY AND DISCUSSION - The two test specimens were subjected to the functional and environmental tests of this test procedure.

The out of tolerance readings that were obtained during various portions of the test are summarized in Table 1.

The major specimen discrepancies are noted as follows:

Ref. Para 4.1.8	The x-ray photographs taken before and after the Flow Test are shown in Figure [illegible] and 6. There is no physical change indicated by the x-ray's. However, the capacitance, and velocity of propogation measurements were out of tolerance in the proof cycle after the Flow Test. The results of the Fungus Resistance Test are shown at the end of the conclusion page
Ref. Para 4.1.8.3.3	The Corona extinction voltage of both specimens measured below both the specification requirements and the manufacturer's specifications. This difference in results, to some degree, can be contributed to different test procedures.
Ref. Para 4.1.8.3.4 and Para 4.15.1	At the temperature of +200°C the dielectric in the Raytherm 10-87A cable became semi-liquid and bubbles were formed in the dielectric, there by changing the electrical characteristics of the cable. However, it should be noted, that this temperature exceeds the manufactures specifications for the maximum operating temperature for this cable.

SUMMARY AND CONCLUSIONS - (Continued)

SUMMARY AND DISCUSSION - (Continued)

Ref. Para 4.17.1 — The attenuation for both test specimens increased by a factor of about 3 to 1 in the aging stability test.

Ref. Para 4.9 — Only the capacitance of the test specimens, was monitored during this test.

There was a slight jump of approximately 1.00 mmfd capacitance during vibration at 1200, and 1500 cps in the Y-Axis; 55, 750 and 1350 cps in the X-Axis, and 750, and 1050 cps in the Z-Axis, of the Raytherm cable. There were no out of tolerance readings in the proof cycle after shock and vibration tests.

CONCLUSION

It is difficult to make a definite conclusion in a test of this nature. The test specimens were continually being changed in size and configuration, and, during each test, connectors had to be connected to the cable to permit the taking of R. F. measurements. Therefore, for any given test, type "N" connectors and in some cases interconnecting cables could have contributed to test setup and measurement errors.

It will be observed that, with the exception of cases noted in the summary, all out of tolerance readings are marginal and are not severe enough to seriously effect the operation of the cable in a R. F. System.

It is felt that, for testing purposes, the requirements of Convair Specification No. 27-06204 could be relaxed to compensate for necessary variations to the ideal laboratory test setup as will be encountered in environmental testing.

1.0 GENERAL INFORMATION:

1.1 PURPOSE - The purpose of this report is to describe the test equipment and procedure required for the Pre-Production Testing of components in accordance with the individual component specification and the latest issue of Convair Specification No. 7-00209.

1.2 ENVIRONMENTAL TESTS - The environmental tests prescribed in this procedure are written to conform to the individual component specification and the current issue of Convair Specification No. 7-00209. In the event of conflict between specifications, the component specification shall take precedence.

1.3 NOMENCLATURE - The specific component under test shall be referred to as "Test Specimen" in this procedure.

1.4 TEST DATA - One copy of this report shall be bound into a data book and all original data and operating time, in minutes, recorded therein. The data book shall be kept on file in the Components Test Laboratory.

1.5 WITNESSING - Data from all tests outlined in this procedure shall be witnessed and signed by an Air Force representative or his designated alternate.

1.6 SEQUENCE OF TESTS - The Initial Satisfactory Performance Test shall be performed on the Test Specimen prior to all other tests. The sequence of subsequent tests shall be determined by the availability of environmental facilities.

1.7 VARIATIONS - Variations to Convair Specification No. 7-00209 and/or the individual component specification shall be issued in the form of a memorandum to the applicable portions of this procedure.

Deviations to the above specifications shall be processed by the Design Engineering Group based on the variations, if any, outlined in this procedure.

2.0 DESCRIPTION AND REQUIREMENTS:

2.1 DESCRIPTION OF TEST SPECIMEN: The test specimens covered by this procedure consist of two types of aluminum jacketed radio frequency cable: (1) Amphenol No. 421-608 and (2) Raytherm No. 10-087A. These cables conform to Convair Specification #27-06204.

2.2 REFERENCES: Applicable portions of the following publications shall form part of this procedure.

a) Convair Spec. No. 7-00209B, "Environmental Design Conditions and Environmental Test Procedures for WS-107A-1 Equipments."

b) Convair Spec. No. 27-06204, "Cable-Radio-Frequency, Aluminum Jacketed, Missileborne Specification For."

2.3 OPERATING REQUIREMENTS AND TOLERANCES -

2.3.1 DC RESISTANCE: The DC Resistance of the inner conductor shall not exceed 0.002 ohms per foot at room temperature.

2.3.2 INSULATION RESISTANCE: The insulation resistance between the inner conductor and the outer conductor (aluminum jacket) shall be at least 100 megohms per 100 feet when subjected to 200 volts DC.

2.3.3 CAPACITANCE: Capacitance of the unit shall be 29.5 ± 1.5 micromicrofarads per foot when measured at a frequency between 1 kilocycle and 1 megacycle.

2.3.4 CAPACITANCE STABILITY: When a sample of cable is raised to +200° C ± 5°C then cycled to +25°C ± 5°C to -55°C ± 2°C allowing 4 to 8 hours time at each temperature, and after 3 such cycles, the capacitance at 25°C ± 5°C shall not vary more than 0.5 percent from the value measured in Paragraph 2.3.3. In addition, measurements of capacitance made during the cycling period shall be within the range given in Paragraph 2.3.3.

2.3.5 IMPEDANCE: The characteristic impedance of the unit shall be 50 ± 2 ohms.

2.3.6 UNIFORMITY OF IMPEDANCE: The average characteristic impedance shall not differ from the initial impedance of Paragraph 2.3.5 by

2.0 DESCRIPTION AND REQUIREMENTS: (Continued)

2.3.6 UNIFORMITY OF IMPEDANCE: (Continued)

more than 2.5%, and the RMS deviation shall not be more than 3.0% of the average impedance when measured at a minimum of 20 frequencies between 40 megacycles and 420 megacycles.

2.3.7 ATTENUATIONS: The attenuation of the unit shall not exceed 4.2 db per 100 feet of length at a frequency of 400 megacycles.

2.3.8 VELOCITY OF PROPOGATION: The velocity of propogation of the unit shall be 69.5 ± 0.5% of the velocity of light.

2.3.9 CORONA: When a 60 cycle AC voltage is applied, between the inner conductor and jacket, and increased gradually until corona is initiated and then gradually reduced to corona extinction point, the voltage at the corona extinction point, shall not be less than 5000 volts RMS. See paragraph 4.1.10.7.

2.3.10 ATTENUATION AND CORONA STABILITY: After temperature cycling to +200° ± 5°C to +25° ± 5°C to -55° ± 2°C to +25° ± 5°C, remaining at each temperature for 4 hours or longer, and 3 complete cycles, at room temperature the attenuation and corona stability shall be within the limits of Paragraphs 2.3.7 and 2.3.9. The unit shall be capable of being wrapped 360° around a mandrel whose diameter is 20 times the outside diameter (0.325 ± 0.005 inches) of the unit, after which the attenuation and corona stability shall be within the limits of Paragraphs 2.3.7 and 2.3.9.

2.3.11 CONTINUITY: Each conductor in each shipping length shall show electrical continuity with an applied potential of 6 volts DC.

2.3.12 DIELECTRIC STRENGTH: The Dielectric Strength between the center conductor and the outer jacket shall be such that the unit will withstand 10,000 volts (RMS) for one minute without leakage or breakdown at room temperature and sea level pressure. See Paragraph 4.1.10.7.

3.0 TEST FACILITIES AND EQUIPMENT:

3.1 INITIAL SATISFACTORY PERFORMANCE TEST EQUIPMENT:

The following equipment or its equivalent shall be used for this test.

3.1.1 L and N Test Set Model 5305.

3.1.2 G.R. Megohm Bridge Type 544B.

3.1.3
a) H.P. 200 CD Audio Oscillator
b) G.R. 7-16c Capacitance Bridge
c) H.P. 400 D V.T.V.M.

3.1.4
a) H.P. 608D VHF Signal Generator
b) H.P. 803A VHF Bridge
c) H.P. 417A VHF Detector
d) Dumont 304A Oscilloscope

3.1.5
a) H.P. 608D VHF Signal Generator
b) H.P. 420B Crystal Detector
c) H.P. 415B Standing Wave Indicator
d) Jertsch FM-3 Frequency Meter

3.1.6
a) Biddle Model 1 Corona Tester
b) Vacuum Chamber with pumping and monitoring equipment.
c) Tektronix 545 Oscilloscope with high pass filter.

3.1.7 Triplett Multimeter Model 630A.

3.0 TEST EQUIPMENT AND FACILITIES:

3.2 PROOF CYCLE TEST EQUIPMENT:

The Proof Cycle Test Equipment will be the same as listed in Paragraph 3.1 with the exception of Paragraphs 3.1.1 and 3.1.6.

3.3 ENVIRONMENTAL EQUIPMENT:

3.3.1 TEMPERATURE-ALTITUDE-HUMIDITY EQUIPMENT: A BEMCO Environmental Chamber, Model WFA-100-45, or equivalent, shall be used.

3.3.2 VIBRATION EQUIPMENT: A MB C-25H Vibration System, or equivalent, together with suitable monitoring equipment shall be used.

3.3.3 HIGH TEMPERATURE TEST EQUIPMENT: A Modern Laboratory Equipment Co. High Temperature Oven, Model 1095 SS, or its equivalent, shall be used.

3.3.4 SAND AND DUST EQUIPMENT: A Hieatt Sand and Dust Test Chamber, Model SDHL-64, or its equivalent, shall be used.

3.3.5 SALT SPRAY TEST EQUIPMENT: An Industrial Salt and Fog Corrosion Cabinet, Type CA-1, or its equivalent shall be used.

3.3.6 SHOCK TEST EQUIPMENT: A Hyge Impact Tester, Model 32, or its equivalent, shall be used.

4.0 TEST PROCEDURES:

4.1 TEST CONDITIONS:

4.1.1 ATMOSPHERIC CONDITIONS - Unless otherwise specified herein or in the test specimen specification, all tests shall be performed at an atmospheric pressure between 28 inches and 32 inches of mercury, a temperature between +60°F and 95°F, and a relative humidity of not more than 90%. Data from tests performed at other than the atmospheric conditions specified shall include corrections for instrument compensation.

4.1.2 TOLERANCES - The maximum allowable tolerances on test conditions shall be as follows:

a)	Temperature	±4°F
b)	Barometric Pressure	±5% in feet of equivalent altitude.
c)	Relative Humidity	±10%
d)	Vibration Amplitude	±10%
e)	Vibration Frequency	±2%
f)	Acceleration	±10%
g)	Shock	±10%

4.1.3 MEASUREMENTS - All measurements shall be made with instruments whose accuracies have been certified by the Astronautics Standards Laboratory and which bear a current calibration decal.

4.1.4 TEST SPECIMEN OPERATION - Operational and functional tests of the test specimen shall be conducted as outlined in this procedure.

4.1.5 ADJUSTMENTS AND REPAIRS DURING TESTS - No adjustments, maintenance, or repairs of the test specimen, other than those specifically stated in this procedure, shall be allowed after the start of the Initial Satisfactory Performance Tests. Exceptions to this shall be made when in the opinion of the Components Test Lab and designated witnesses, adjustments, repairs, or maintenance are not due to faults in design, workmanship, materials, or to the test conditions imposed.

4.1.6 TEMPERATURE STABILIZATION - Temperature stabilization has been reached when the temperature of the largest centrally located mass of the test specimen does not vary more than 5°F from the temperature ambient to the equipment.

4.0 TEST PROCEDURES: (Continued)

4.1.7 PRELIMINARY INSPECTION - The test specimen shall be examined visually prior to any other test to determine that the specimen meets the requirements of workmanship, identification markings, external dimensions, finish, cleanliness, and proper inspection approval.

4.1.8 INITIAL SATISFACTORY PERFORMANCE TESTS:

4.1.8.1 A test sample, of 100 feet in length and identified as Unit #1, shall be subjected to the following tests.

4.1.8.1.1 The continuity of the test specimen shall be checked with an ohmmeter on the X1 scale.

4.1.8.1.2 The DC resistance of the test specimen shall be measured.

4.1.8.1.3 The insulation resistance of the test specimen shall be measured with 500 volts DC applied.

4.1.8.1.4 Type "N" male connectors shall then be joined to the ends of the test specimen. The attenuation of the test specimen shall be measured at a frequency of 400 mcs. The test setup of Paragraph 3.1.5 shall be used for this test.

4.1.8.1.5 The Characteristic Impedance of the test specimen shall be measured at 20 frequencies between 40 mcs and 420 mcs in 20 mcs increments. At each frequency 3 measurements will be made: (1) Z_{oc}; (2) Z_{sc} and (3) Z_L with a 50 ohm load. The test setup of Paragraph 3.1.4 shall be used for this test.

4.0 TEST PROCEDURES: (Continued)

4.1.8 INITIAL SATISFACTORY PERFORMANCE TESTS: (Continued)

4.1.8.2 A test sample 30 feet in length, identified as Unit #2, shall be cut off the test specimen of Paragraph 4.1.8.1 and subjected to the following tests. Type "N" connectors shall be joined to both ends of the test specimen.

4.1.8.2.1 The velocity of propogation of the test specimen shall be measured with one end of the test specimen short circuited. The test setup of paragraph 3.1.5 shall be used for this test.

4.1.8.2.2 The capacitance of the test specimen shall be measured at a frequency of 10 Kilocycles. The test setup of paragraph 3.1.3 shall be used for this test.

4.1.8.3 A test sample 30 feet in length, identified as Unit #3, shall be cut off of test specimen Unit #1, and subjected to the following tests. Type "N" connectors shall be applied to both ends of the unit.

4.1.8.3.1 The capacitance of the unit shall be measured at a frequency of 10 kilocycles.

4.1.8.3.2 The attenuation of the unit shall be measured at a frequency of 400 megacycles.

4.1.8.3.3 With a 60 cycle AC voltage applied to the test specimen, the peak leakage current, in the frequency range of 1 mcs to 30 mcs, shall be recorded with 5000 V RMS and 10000 VRMS applied to the test specimen.

The type "N" connectors shall be removed for this test. The test setup block diagram is shown in Figure 3.

4.1.8.3.4 The test specimen shall be subjected to 3 temperature cycles. Each temperature cycle shall consist of the following: The chamber temperature shall be changed from +25±5°C to +200±5°C to +25±5°C to -55±2°C to +25±5°C allowing a minimum of 4 hours at each temperature. The capacitance of the test specimen shall be measured while the test specimen is stabilized at each temperature. At the conclusion of the third temperature cycle the tests of Para. 4.1.8.3.2 and Para. 4.1.8.3.3 shall be repeated.

4.0 TEST PROCEDURES: (Continued)

4.1.8 INITIAL SATISFACTORY PERFORMANCE TEST: (Continued)

4.1.8.3.5 The unit shall be wrapped 360° around a mandrel whose outside diameter is 6.5 inches. The tests of Para. 4.1.8.3.2 and Para. 4.1.8.3.3 shall be repeated.

4.1.9 PROOF CYCLE: The Proof Cycle during Environmental Testing of the units shall consist of the following tests:

4.1.9.1 The continuity of the test specimen shall be checked with the Triplett Ohmmeter.

4.1.9.2 The insulation resistance shall be measured with 500 VDC applied. The G.R. 544B Megohm Bridge shall be used for this test.

4.1.9.3 The capacitance of the unit shall be measured at a frequency of 10 KCS with the test setup of Paragraph 3.1.3.

4.1.9.4 The attenuation of the test specimen shall be measured at a frequency of 400 mcs with the test setup of Paragraph 3.1.5.

4.1.9.5 The velocity of propogation shall be measured with the test setup of Paragraph 3.1.5.

4.1.9.6 The impedance of the test unit shall be measured with the test test setup of Paragraph 3.1.4 at a frequency of 225 mcs.

4.1.10 SPECIAL INSTRUCTIONS:

4.1.10.1 The test specimen identified as Unit #2 shall be subjected to the tests of Paragraphs 4.2.1.1, 4.3.4.4, 4.5, and 4.6.

4.1.10.2 A test specimen, 40 inches in length identified as Unit #4, shall be cut off unit #2 and subjected to the tests of Paragraphs 4.8.1.1 and 4.9 while mounted to a test jig as shown in Figure 4.

4.1.10.3 A test specimen, 25 inches in length identified as Unit #5, shall be cut off unit #2 and subjected to the tests of paragraph 4.15.

4.1.10.4 A test specimen, 50 inches in length identified as Unit #6, shall be cut off Unit #2 and subjected to the tests of Paragraph 4.16.

4.1.10.5 Three (3) test specimens, each 50 inches in length, identified as Unit #7, Unit #8 and Unit #9, shall be cut off Unit #2 and

4.0 TEST PROCEDURES: (Continued)

4.1.10 SPECIAL INSTRUCTIONS: (Continued)

4.1.10.5 subjected to the tests of Paragraph 4.17.

4.1.10.6 A test specimen, 20 inches in length, identified as Unit #10, shall be cut off Unit #2 and subjected to the tests of Paragraph 4.18.

4.1.10.7 Due to the ambiguity of Corona and leakage as defined in Paragraphs 2.3.9 and 2.3.12 the "Corona" current and "Leakage" current shall be measured at the two voltage levels in lieu of trying to define "Corona" and "Leakage" for this application. The test setup to be used in this test is shown in Figure 4.

4.0 TEST PROCEDURES: (Continued)

4.2 TEMPERATURE - ALTITUDE - HUMIDITY TESTS -

4.2.1 MISSILEBORNE EQUIPMENT - Missileborne equipment shall be subjected to the following test sequences, as applicable.

4.2.1.1 MISSILEBORNE EQUIPMENT OTHER THAN POD-MOUNTED CANISTERS - The following test sequence shall be conducted in a Temperature - Altitude - Humidity Test Chamber in the order specified. A thermocouple shall be placed in good thermal contact on the largest centrally located internal mass within the test specimen, or in any other location necessary to check temperature stabilization.

a) Place test specimen in chamber. Chamber temperatures and atmospheric conditions as specified in Paragraph 4.1.1.

Perform Proof Cycle tests as specified in the applicable Paragraph of 4.1.9, and record data.

b) Stabilize test specimen (non-operating) at plus 125°F for one hour.

Maintain chamber temperature and subject largest surface area of test specimen to radiant heat at the rate of 100 to 120 watts/sq. ft/hr for a period of 4 hours.

Determine the maximum test specimen temperature during this test for use in the following test requiring a "maximum non-operating temperature".

c) Reduce chamber temperature to minus 65°F at a rate of 0.75 to 1.25°F per minute.

Maintain the above temperature for a period of not less than 8 hours, or until the test specimen stabilizes, whichever is longer.

Raise chamber temperature to minus 30°F and maintain at this temperature until test specimen temperature stabilizes.

During or at the end of the minus 30°F temperature period, reduce the chamber absolute pressure to 3.44 inches of mercury for one hour and then return the chamber to approximately 30 inches of mercury.

4.0 TEST PROCEDURES: (Continued)

4.2.1.1 MISSILEBORNE EQUIPMENT OTHER THAN POD-MOUNTED CANISTERS - (Continued)

c) (Continued)

At minus 30°F and 30 inches of mercury, perform the Proof Cycle Tests specified in the applicable paragraph of 4.1.9 and record the data.

At minus 30°F, operate the test specimen as specified in the applicable paragraph of 4.1.9 while reducing the chamber absolute pressure to 1 mm of mercury within 10 minutes, and record all data.

d) With test specimen non-operating, return chamber pressure to 30 inches of mercury and increase chamber temperature at the rate of 0.75 to 1.25°F per minute to the maximum non-operating temperature or plus 160°F, whichever is greater, and maintain at this temperature for 4 hours or until test specimen temperature stabilizes, whichever is longer.

Maintain chamber at maximum non-operating temperature and a relative humidity of 95% for a period of not less than 8 hours.

Remove excess moisture and condensate from chamber prior to performing the following altitude tests.

Reduce chamber internal absolute pressure to 3.44 inches of mercury (relative humidity may be decreased) for 1 hour.

Return chamber pressure to approximately 30 inches of mercury and a relative humidity of not less than 95%.

At the maximum non-operating temperature (or 160°F, whichever is greater), and a relative humidity of not less than 95%, operate the test specimen as specified in the applicable paragraph of 4.1.9 and record all data.

Remove excessive moisture and condensate from the chamber prior to performing the following altitude tests.

Operate test specimen as specified in the applicable paragraph of 4.1.9 while reducing chamber internal absolute pressure to 1 mm of mercury within a period of 10 minutes (no humidity control), and record all data.

4.0 TEST PROCEDURES: (Continued)

4.2.1.1 MISSILEBORNE EQUIPMENT OTHER THAN POD-MOUNTED CANISTERS - (Cont.)

e) Return chamber absolute internal pressure to 30 inches of mercury, a chamber temperature to plus 40°F at a rate of 0.75 to 1.25°F per minute, and a relative humidity of not less than 95%. Maintain above conditions for a period of 4 hours or until equipment stabilizes, whichever is greater.

At the end of the stabilizing period, operate the test specimen as specified in the applicable paragraph of 4.1.9 and record all data.

f) Return chamber to conditions specified in Paragraph 4.1.1 and maintain at these conditions until equipment temperature stabilizes.

Perform Proof Cycle tests on specimens as specified in the applicable paragraph of 4.1.9 and record all data.

4.2.1.2 MISSILEBORNE POD- MOUNTED CANISTERS - Not applicable.

4.2.2 TEST GROUND SUPPORT EQUIPMENT - Not applicable.

4.0 TEST CONDITIONS: (Continued)

4.3 SALT ATMOSPHERE TEST - The test specimen shall be mounted in the test chamber.

Increase the temperature of the test chamber to 95°F ±3°F and maintain at this temperature.

Compressed air shall be bubbled through a salt solution causing a saline vapor to permeate the chamber. Sodium chloride of C.P. quality shall be used. The concentration of salt shall be 2.35 per cent by weight, with a hydrogen ion concentration of pH 6.8 to 7.2.

Duration of the Salt Atmosphere Test shall be at least 100 hours.

At the completion of the test period, the specimen shall be operated according to the test specified in the applicable paragraph of 4.1.9 and a record shall be made of all data.

4.4 FUNGUS RESISTANCE TEST - Fungus resistance tests shall be performed according to the following procedure:

4.4.1 PROCEDURE - Five groups of fungi are listed below, and one species of fungus from each group shall be used. In the preparation of the spore suspension, distilled water having a pH value between 5.8 and 7.2 at temperatures between 72°F and 89°F shall be utilized. Approximately 10 ml of distilled water shall then be introduced directly into a tube culture of the fungus and the spores brought into suspension by gentle rubbing of the spore layer with an inoculating loop without disturbing the agar surface. This process is repeated for each species of fungus. The separate spore suspensions from the five species of fungi shall be mixed together to provide a composite suspension. Actively sporulating cultures between 7 to 21 days old after initial inoculation shall be used for the preparation of the spore suspension. After preparation, the spore suspension will not be be kept for more than a 24 hour period at temperatures of 35° to 45°F. The equipment, including applicable external connections, shall be placed in a chamber equal to that described in Specification MIL-C-9452, maintained at internal temperature of 30° ±2°C (86° ±3.5°F) and a relative humidity of 95 ±5 percent, and sprayed with the suspension of mixed spore. The test period shall be 28 days. At the end of the test period, the test item shall be examined visually in accordance with Paragraph 4.1.7.

4.0 TEST PROCEDURES: (Continued)

4.4.1.1 ORGANISMS -

Group I Chaetomium globosum USDA 1042.4 Myrothecium verrucaria USDA 1334.2.

Group II Rhizopus nigricans S.N. 32 or Aspergillus niger USDA To215-4247.

Group III Aspergillus flavus WADC No. 26 or Aspergillus terreus PQMD 82J.

Group IV Penicillium luteum USDA 1336.1, Penicillium sp USDA 1336.2 or Penicillium citrinum ATCC 9849.

Group V Mammoniella echinata WADC No. 37 or Fusarium moniliforme USDA 1004.1.

4.5 RAIN TEST - The rain test shall be performed according to the following procedure:

4.5.1 PROCEDURE - The test specimen shall be mounted in the test chamber to simulate installation conditions. The rain test temperature shall be maintained between 20° and 30°C (68° to 86°F) throughout the test period. A simulated rainfall of 4± 1 inch per hour shall be produced by means of a water spray nozzle of such design that the water is emitted in the form of small droplets rather than a fine mist. The temperature of the water shall be maintained between 11°C to 20°C (51.8 to 68°F). The rainfall shall be dispersed uniformly over the test area within the the limits as specified above. Duration of the test shall be 2 hours, at the completion of which the equipment shall be examined for evidence of water penetration or damage. At the completion of the test, the unit shall be operated through one proof cycle and a record made of all data to determine compliance with the requirements of this specification.

4.0 TEST PROCEDURES: (Continued)

4.6 SAND AND DUST TEST - The sand and dust test shall be performed according to the following procedure.

4.6.1 PROCEDURE - The test specimen shall be placed within the test chamber equal to that described in specification MIL-C-9436 and the sand and dust density raised and maintained at 0.1 to 0.5 grams per cubic foot within the test space. The relative humidity shall not exceed 30 percent at any time during the test. Sand and dust used in the test shall be of angular structure and shall have characteristics as follows:

a) 100 percent of the sand and dust shall pass through a 100 mesh screen, U.S. Standard Sieve Series.

b) 98 ± 2 percent of the sand and dust shall pass through a 140 mesh screen, U.S. Standard Sieve Series.

c) 90 ± 2 percent of the sand and dust shall pass through a 200 mesh screen, U.S. Standard Sieve Series.

d) 75 ± 2 percent of the sand and dust shall pass through a 325 mesh screen, U.S. Standard Sieve Series.

e) Chemical analysis of the dust shall be as follows:

SUBSTANCE	PERCENT BY WEIGHT
SiO_2	97 to 99
Fe_2O_3	0 to 2
Al_2O_3	0 to 1
TiO_2	0 to 2
MgO	0 to 1
Ign Losses	0 to 2

The internal temperature of the test chamber shall be maintained at 25°C (77°F) for a period of 6 hours, with sand and dust velocity through the test chamber between 100 to 500 feet per minute (2300 ± 500 feet per minute if specified in the detail specification). After 6 hours at above conditions, the temperature shall be raised to and maintained at 71°C (160°F). These conditions shall be maintained for 6 hours. At the end of this test period, the

4.0 TEST PROCEDURES: (Continued)

4.6 SAND AND DUST TEST - (continued)

4.6.1 PROCEDURE - (continued)

equipment shall be removed and allowed to cool to room temperature and shall be operated and a record made of all data necessary to determine compliance with the test specified in applicable paragraphs of 4.1.9,

4.7 EXPLOSION PROOF TESTS - Not required.

4.8 NON-OPERATING SHOCK TESTS- Test specimens shall be subjected to the following shock tests as specified in the particular component specification, except where the test specimen size and weight make it impractical to do so.

4.8.1 SHOCK TESTS - Immediately following each of the following test procedures, the test specimen shall be operated and a record made of all data necessary to determine compliance with the applicable paragraph of 4.1.9.

4.8.1.1 PROCEDURE I - The test specimen, when not packaged for shipment, shall be subjected to a shock whose shock spectrum in both plus and minus directions is at least 100 G for each frequency from 100 to 700 cps. The shock shall be applied at least once along each of three mutually perpendicular axes. If the test specimen is vibration mounted on the missile, the shocks shall be applied with the vibration mounting removed.

4.8.1.2 PROCEDURE II - Not applicable.

4.8.2 VIBRATION TESTS - Not applicable.

4.0 TEST PROCEDURES: (Continued)

4.9 OPERATING VIBRATION TESTS - Missileborne equipment shall be subjected to the following test while operating. A record shall be made of all data necessary to determine compliance with the tests outlined in the applicable paragraph of 4.1.9. The vibration test jig is shown in Figure 4.

4.9.1 PROCEDURE - The test specimen shall be subjected to a slow speed scanning sweep, at frequencies and amplitudes of sinusoidal vibration as shown in Figure 1, and a sweep period as shown in Figure 2, along each of any three mutually perpendicular axes of the test specimen. The resonant frequencies for each axis shall be determined by the following methods:

a) Increased acceleration measured on the test specimen with constant input accelerations, measured at the test specimen mounting points.

b) Excessive noise emitted from the equipment.

c) Erratic operation, or failure of the equipment.

4.10 OPERATING ACCELERATION TESTS - Not required.

4.11 TEMPERATURE SHOCK TEST - Not required.

4.12 SUNSHINE TEST - Not required.

4.13 RADIO INTERFERENCE TESTS - Not required.

4.14 LIFE TESTS - Not required.

4.15 HEAT AGING:

4.15.1 PROCEDURE: A specimen of the unit, 75 times the unit diameter in length shall be placed in a high temperature chamber for 7 days. The temperature in the chamber shall be maintained continuously at 200° ± 5°C. After this heating and aging period, the specimen shall be removed from the chamber and conditioned at room temperature for approximately 1 hour. The specimen shall then be wound around a mandrel whose diameter is 20 times the outside diameter of the unit. The specimen shall then be unwound from the mandrel and visually inspected for evidence of internal or external cracks and shall be operated through one proof cycle and a record made of all data necessary to determine compliance with the performance requirements of this specification.

4.0 TEST PROCEDURES: (Continued)

4.16 COLD BEND TEST:

4.16.1 PROCEDURE: A specimen of the unit at least 150 times the cable diameter in length shall be conditioned for 20 hours at minus 55° ± 2°C. After this conditioning, but while the specimen is still in the cold chamber at the conditioning temperature, the specimen shall be wrapped for at least 3 close turns around a mandrel whose diameter is 20 times the outer cable diameter. The specimen shall then be removed from the cold chamber and visually inspected for evidence of cracks or fractures and shall be operated through one proof cycle and a record made of all data necessary to determine compliance with the performance requirements of this specification.

4.17 AGING STABILITY TEST:

4.17.1 PROCEDURE: Three Specimens of the unit, at least 150 times the outer cable diameter in length, shall be suspended in a test chamber without touching one another or the walls of the chamber. The chamber temperature shall be raised to 200° ± 5°C and the specimen shall be conditioned at that temperature for a period of 7 days. After this conditioning period, specimens shall be removed from the chamber and conditioned at room temperature for a minimum of 4 hours. They shall then be subjected to the cold bend test of Paragraph 4.4.16.1 except the unit shall be operated through one proof cycle at minus 55° ± 2°C and a record shall be made of all data necessary to determine compliance with the performance requirements of this specification.

4.18 FLOW TEST:

4.18.1 PROCEDURE: A specimen of the unit, 30 times the outer cable diameter in length, shall be prepared for test by skinning at least 1 inch at each end to the bare conductor. Each end of the conductor shall be weighted with a weight of 6.0 pounds. The specimen shall be draped symmetrically with the weights hanging freely, over a horizontal test mandrel whose diameter is 20 times the outside diameter of the cable, and placed in a chamber maintained at 98° ± 2°C for 7 ½ hours. The weights shall then be removed from the chamber and allowed to cool to room temperature. The specimen shall not be straightened. The unit shall then be operated through one proof cycle and a record shall be made of all data necessary to determine compliance with the performance requirements of this specification. Then the specimen shall

4.0 TEST PROCEDURES: (Continued)

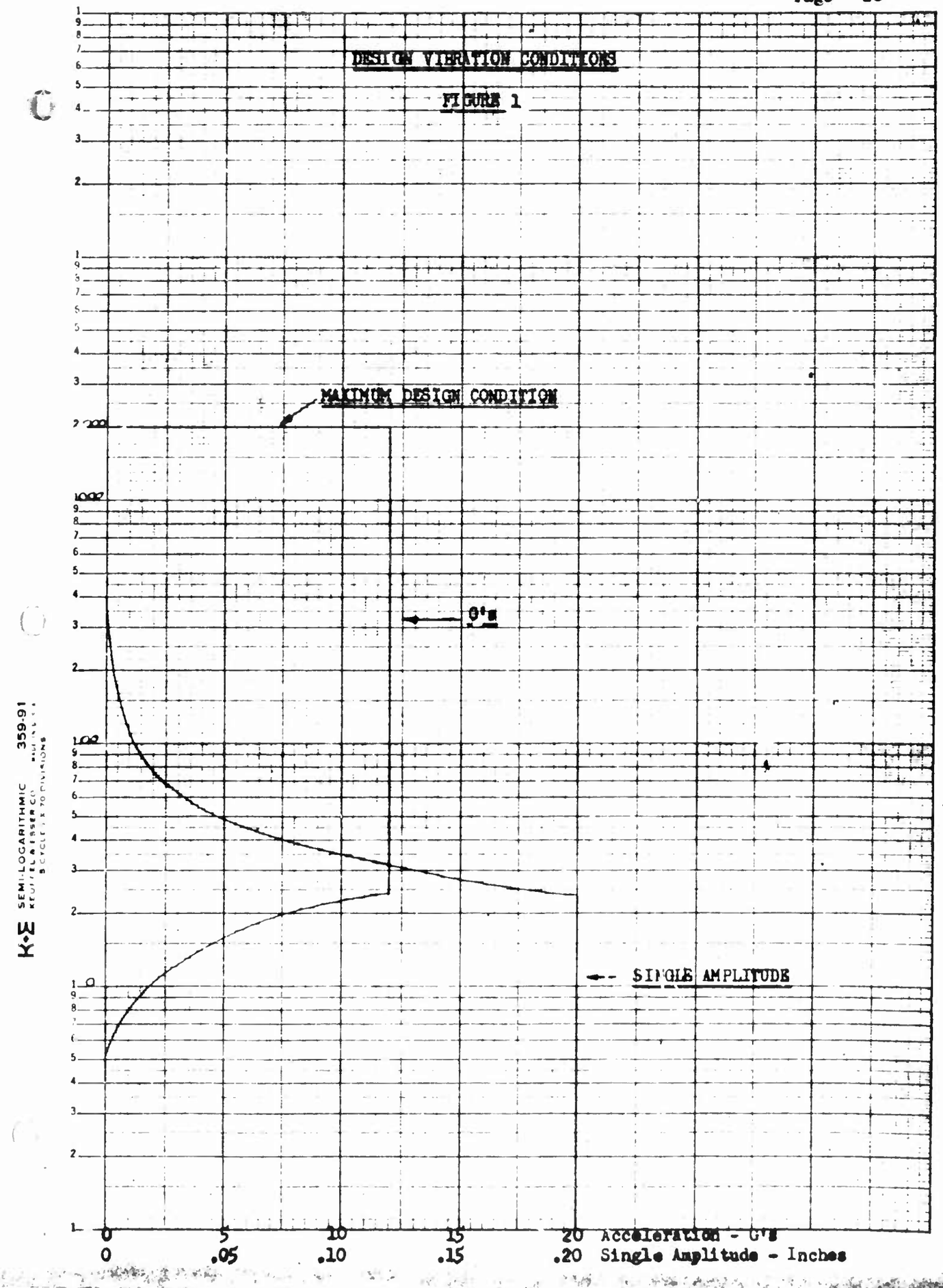
4.18 FLOW TEST: (Continued)

4.18.1 PROCEDURE: (Continued)

either be cut at the middle of the bend with a jeweler's saw or an x-ray photograph shall be taken. Examine the specimen for displacement of the inner conductor from the center of the cable. Displacement shall not be more than 15 percent of the dielectric diameter.

TABLE I - OUT OF TOLERANCE READINGS

TEST	PARAGRAPH	PARAMETER	TEST SPECIMEN
I.S.P.T.	4.1.8.1.5	$\sqrt{Zsc\ Zoc}$	RAY #1
I.S.P.T.	4.1.8.1.5	Z_L	RAY #1
I.S.P.T.	4.1.8.1.5	RMS deviation Z_L	RAY #1
I.S.P.T.	4.1.8.1.5	RMS deviation $\sqrt{Zsc\ Zoc}$	RAY #1
I.S.P.T.	4.1.8.2.1	Velocity of Propogation	RAY #2
I.S.P.T.	4.1.8.3.3	Corona Extinction Voltage	AMP #3
I.S.P.T.	4.1.8.3.4	Capacitance	AMP #3
I.S.P.T.	4.1.8.3.5	Corona Extinction Voltage	RAY #3
I.S.P.T.	4.1.8.3.4	Capacitance	RAY #3
I.S.P.T.	4.1.8.3.5	Attenuation	RAY #3
Proof Cycle	4.1.9	$\sqrt{Zsc\ Zoc}$	AMP #2
Proof Cycle	4.1.9	Velocity of Propogation	RAY #2
Rain Test	4.5	$\sqrt{Zsc\ Zoc}$	AMP #2
Rain Test	4.5	Velocity of Propogation	RAY #2
Salt Atmosphere	4.3	Velocity of Propogation	RAY #2
Sand and Dust	4.6	Velocity of Propogation	RAY #2
Temp-Alt-Humidity	4.2.1.1a	Velocity of Propogation	RAY #2
Temp-Alt-Humidity	4.2.1.1c	Velocity of Propogation	RAY #2
Temp-Alt-Humidity	4.2.1.1c	Attenuation	RAY #2
Temp-Alt-Humidity	4.2.1.1d	Attenuation	RAY #2
Temp-Alt-Humidity	4.2.1.1d	Velocity of Propogation	RAY #2
Temp-Alt-Humidity	4.2.1.1d	Velocity of Propogation	RAY #2
Temp-Alt-Humidity	4.2.1.1d	Attenuation	RAY #2
Temp-Alt-Humidity	4.2.1.1e	Velocity of Propogation	RAY #2
Temp-Alt-Humidity	4.2.1.1f	Velocity of Propogation	RAY #2
Proof Cycle	4.1.9	Velocity of Propogation	AMP #5
Proof Cycle	4.1.9	Velocity of Propogation	RAY #5
Heat Aging	4.1.10.3	Velocity of Propogation	AMP #5
Heat Aging	4.1.10.3	Attenuation	AMP #5
Heat Aging	4.1.10.3	Connector Damaged	RAY #5
Proof Cycle	4.1.9	Velocity of Propogation	RAY #6
Cold Bend	4.1.10.4	Velocity of Propogation	RAY #6
Proof Cycle	4.1.9	Velocity of Propogation	RAY #7
Proof Cycle	4.1.9	Velocity of Propogation	RAY #8
Proof Cycle	4.1.9	Velocity of Propogation	RAY #9
Aging Stability	4.1.10.5	Attenuation	AMP #7
Aging Stability	4.1.10.5	Attenuation	RAY #7
Aging Stability	4.1.10.5	Attenuation	RAY #8
Aging Stability	4.1.10.5	$\sqrt{Zsc\ Zoc}$	RAY #8
Aging Stability	4.1.10.5	Attenuation	AMP #9
Aging Stability	4.1.10.5	Attenuation	RAY #9
Flow Test	4.1.10.6	Velocity of Propogation	AMP #10
Flow Test	4.1.10.6	Capacitance	AMP #10
Flow Test	4.1.10.6	Velocity of Propogation	RAY #10


DESIGN VIBRATION CONDITIONS
FIGURE 1
MAXIMUM DESIGN CONDITION
6'S
SINGLE AMPLITUDE
0
5
10
15
20 Acceleration - G's
0
.05
.10
.15
.20 Single Amplitude - Inches

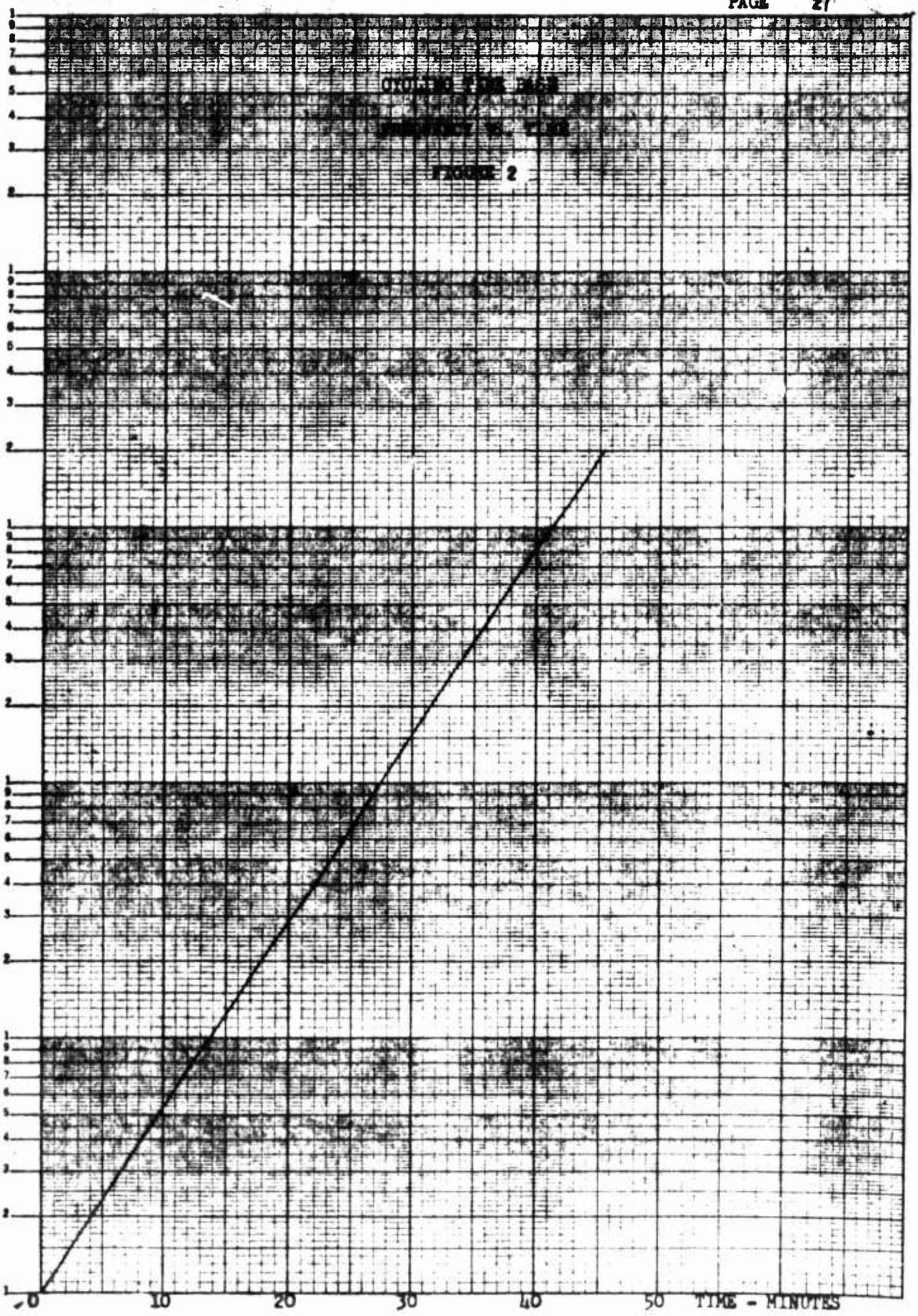
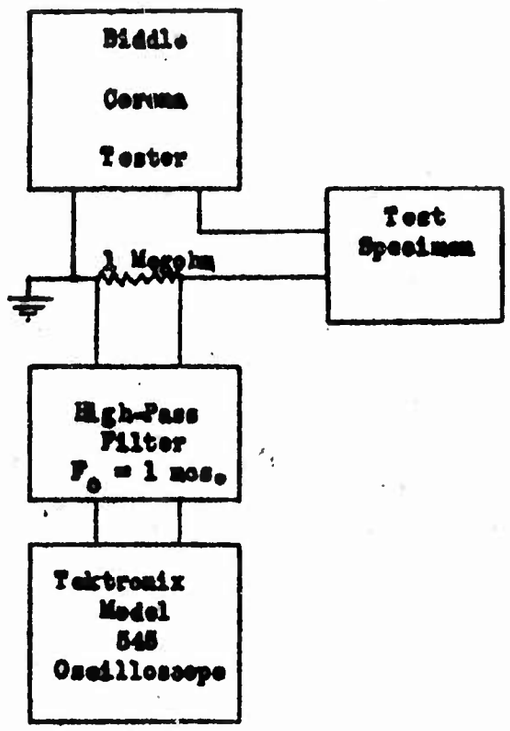


Figure 8



Test Setup for The Measurement of Leakage and Corona Current.

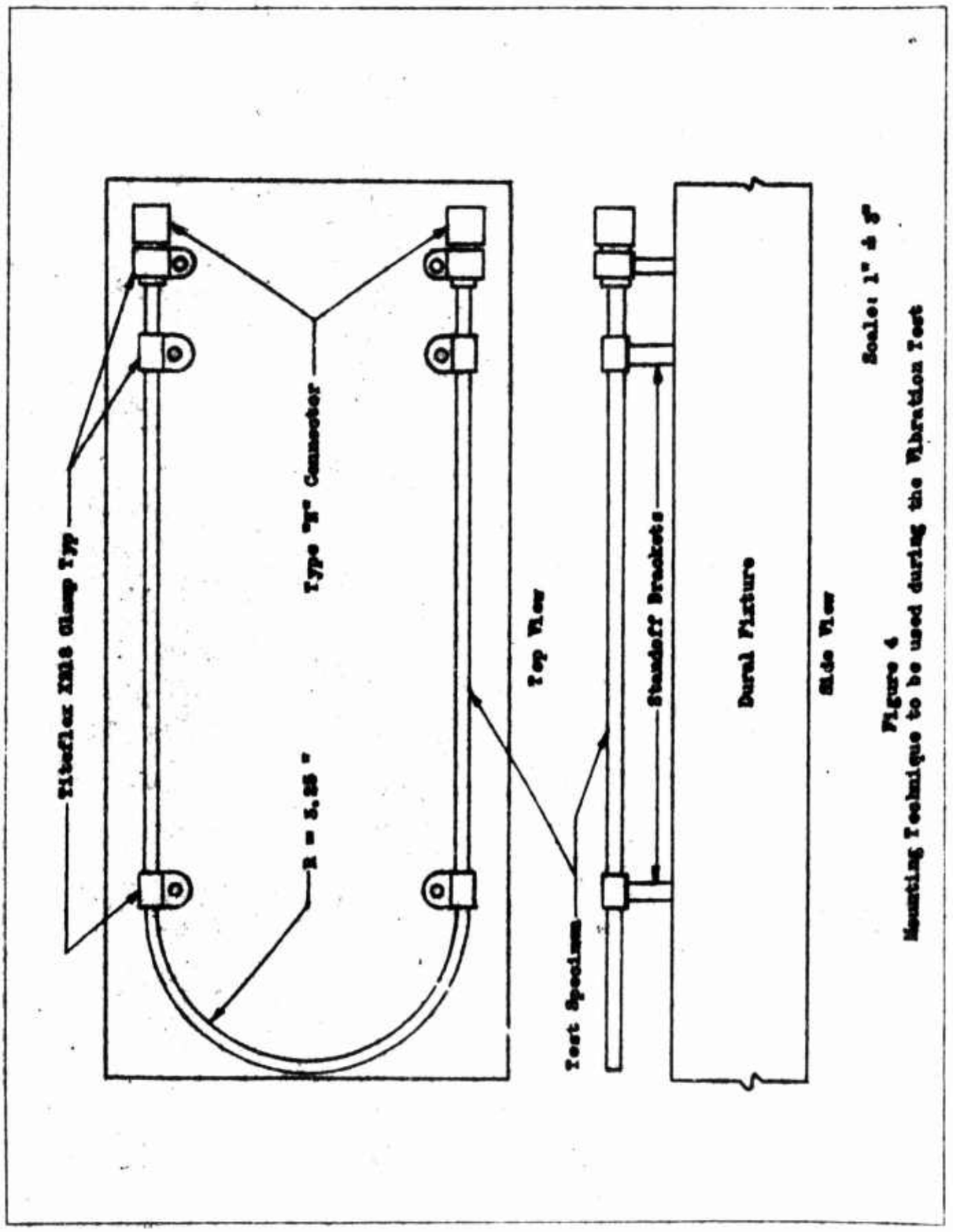
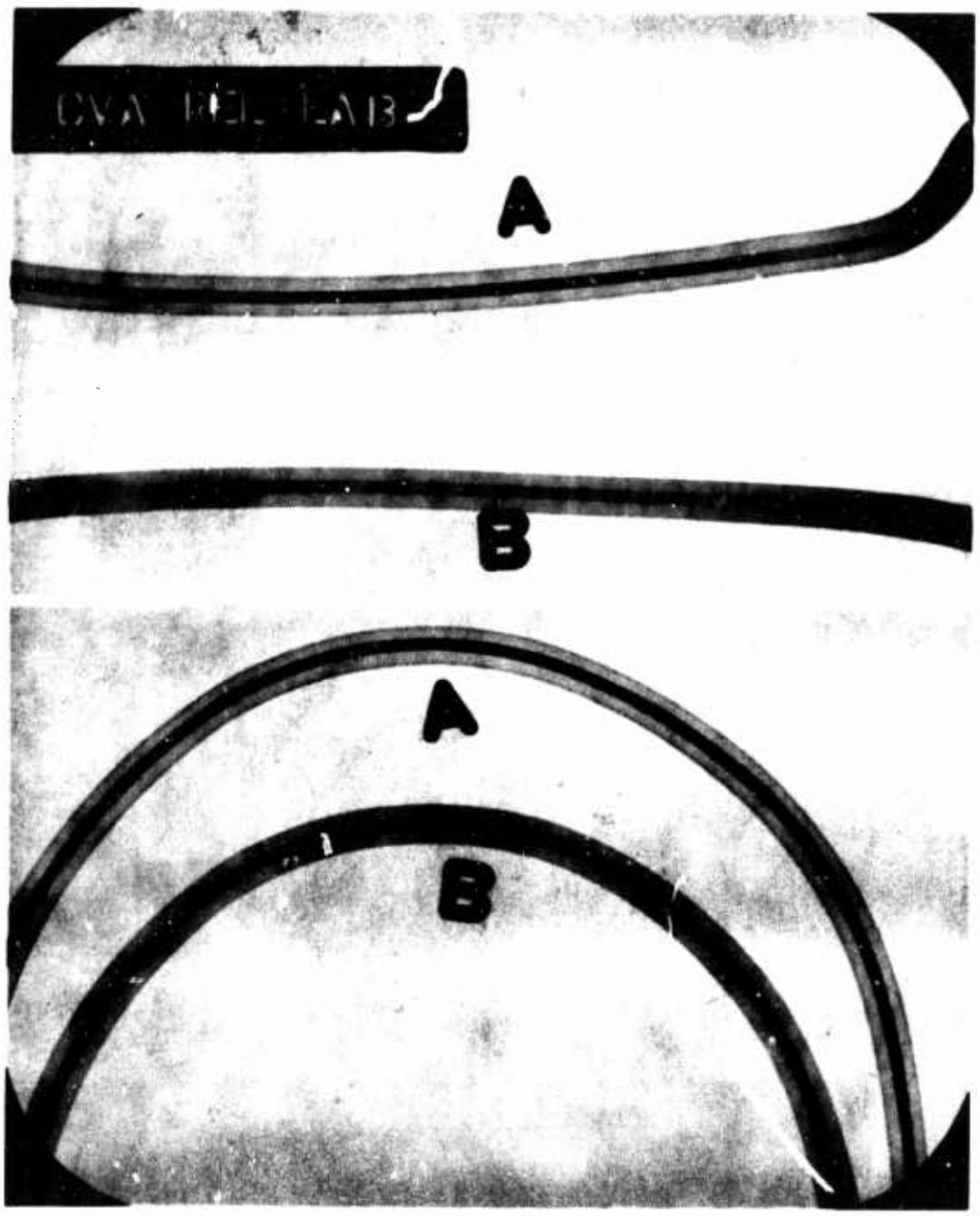


Figure 4
Mounting Technique to be used during the Vibration Test

PHOTO INDEX

PAGE NO.	FIGURE	PHOTO NO.
		CVAC Rel Lab X-Ray
31	5	CVAC Rel Lab X-Ray
32	6	



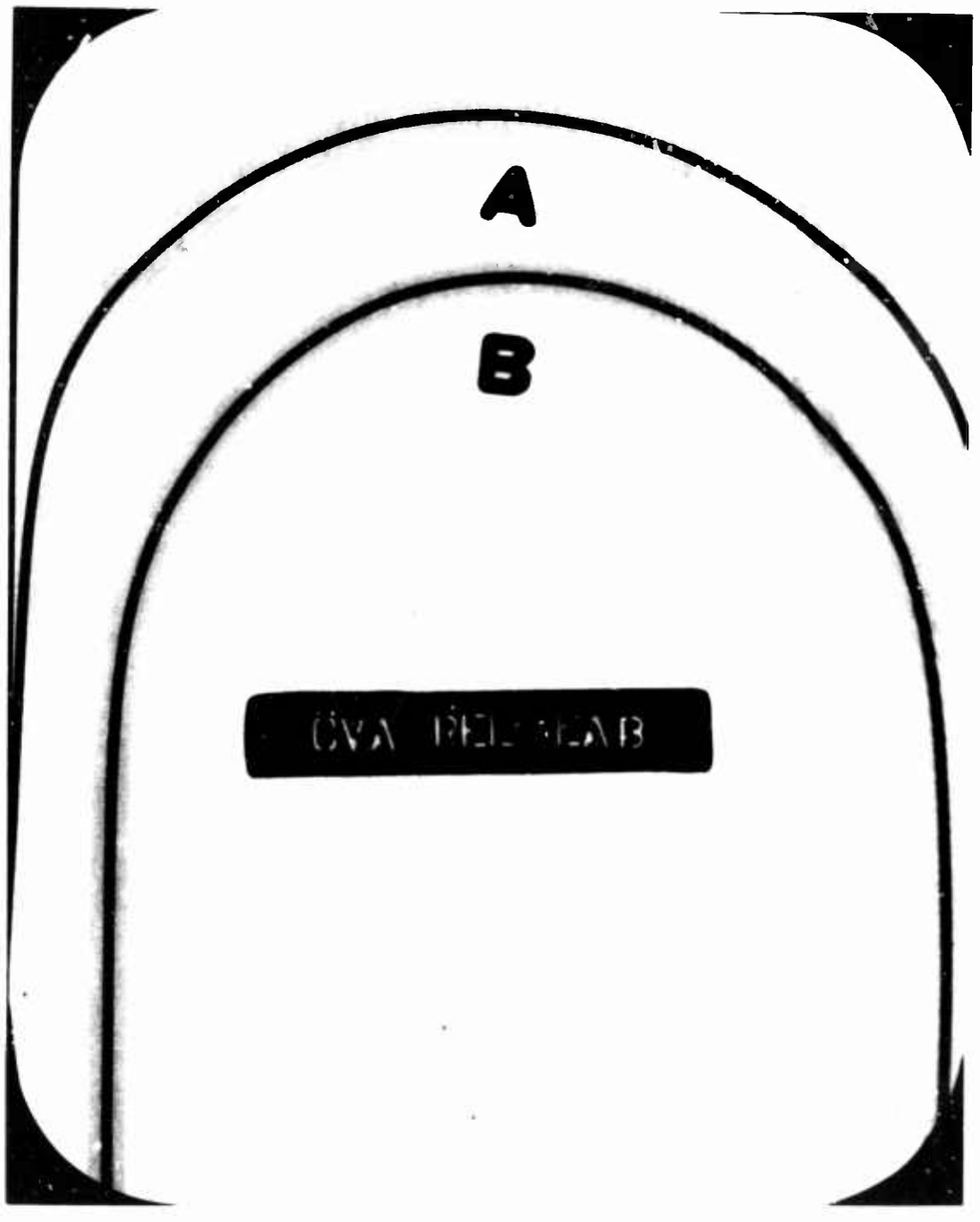
A - RAYTHERM #10

B - AMPHENOL #10

Top Picture is 90° View of Bottom

AFTER FLOW TEST

FIGURE 5



A - Raytherm #10

B - Arphenol #10

BEFORE FLOW TEST

FIGURE 6

4.0 TEST PROCEDURES: (Continued)

Initial Satisfactory Performance Test — Date: 2-18-59

Test Specimen Amphenol 421-608 — Test Engr: J. O. Lively

Unit# 1 (Gonset) — Witness: [signature]

AF Insp. F. C. Walling

Para	Specification Requirement	Data
4.1.8.1.5 (Con't)	(Con't)	

Freq. Mcs.	Z_{sc}	Z_{oc}	$\sqrt{Z_{sc}Z_{oc}}$	Z_1
200	40Ω -60°	61Ω +60°	49.4Ω	50Ω
220	74Ω -53°	31.5Ω +52°	48.6Ω	49Ω
240	132Ω -46°	16Ω +17°	50.8Ω	49.5Ω
260	120Ω +36°	22Ω -36°	50.4Ω	50Ω
280	59Ω +53°	42Ω -53°	50.4Ω	50Ω
300	89Ω -45°	31.8Ω +48°	51.8Ω	50Ω
320	144Ω -6.4°	19.2Ω +19°	52.8Ω	51.6Ω
340	23Ω -71°	106Ω +39°	49.5Ω	50Ω
360	57Ω +51°	45Ω -30°	50.7	51Ω
380	73Ω -61°	32.5Ω +40°	48Ω	49Ω
400	126Ω -4°	20Ω +2°	50.2Ω	50.5Ω
420	96Ω +29°	26.5Ω -31°	50.4Ω	50.5Ω

Average Z_1 49.98 ohms.

Average $\sqrt{Z_{sc}Z_{oc}}$ 50.03 ohms.

RMS Deviation Z_1 0.656

RMS Deviation $\sqrt{Z_{sc}Z_{oc}}$ 1.28

* Signifies out of tolerance readings.

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4.0 TEST PROCEDURES: (Continued)

Initial Satisfactory Performance Test — Date: 2-19-59

Test Specimen RAYTHEON 10-0820 — Test Engr: J D Lively

Unit # 1A (97.5 Ft) — Witness:

AF Insp: F. C. Walling

Para	Specification Requirement	Data
4.1.8.1.1	Specimen shall show electrical continuity.	Specimen shows continuity Yes
4.1.8.1.2	The DC Resistance shall not exceed 0.002 ohms/foot.	Measured DC Resistance 0.145 ohms. Calculated DC Resistance 0.0014 ohms/foot.
4.1.8.1.3	The insulation Resistance shall be no less than 100 megohms/ 100 feet.	Measured Insulation Resistance $>10^6$ megohms. Calculated Insulation Resistance $>10^6$ megohms/ 100 feet.
4.1.8.1.4	The Attenuation shall not exceed 4.2 db per 100 feet of length.	Measured Attenuation 3.83 db.
4.1.8.1.5	The Z_o shall be 50 ± 3 ohms. The average Z_o shall not differ from 50±3 ohms by more than 3.5%. The RMS deviation shall not be more than 3.0% of the average Z_o.	

Freq. Mcs.	Z_{sc}	Z_{oc}	$\sqrt{Z_{sc}Z_{oc}}$	Z_1
40	12.8Ω +9°	270Ω -9°	54Ω *	52Ω
60	120Ω +63°	12Ω -63°	50.5Ω	50Ω
80	245Ω -61°	113Ω +69°	50.4Ω	52Ω
100	32Ω +66°	29Ω -61°	48.8Ω	50Ω
120	38Ω -65°	65Ω +65°	49.7Ω	50Ω
140	55Ω +58°	49Ω -63°	52Ω	51Ω
160	58Ω -62°	41Ω +62°	48.8Ω	50Ω
180	34Ω +60°	72Ω -56°	49.5Ω	51Ω

* OUT OF TOLERANCE

4.8 TEST PROCEDURES: (Continued)

Initial Satisfactory Performance Test — Date: 2-19-59

Test Specimen RAYTHEON 10-087A — Test Engr: J. D. Lively

Unit# 1A (97-54) — Witness: [illegible]

AF Insp: F. C. Walling

Para	Specification Requirement	Data
4.1.8.1.5 (Con't)	(Con't)	

Freq. Mcs.	Z_{sc}	Z_{oc}	$\sqrt{Z_{sc}Z_{oc}}$	Z_1
200	97Ω -54°	265Ω +99°	48.1Ω	50Ω
220	23Ω +45°	122Ω -48°	53Ω	52Ω
240	142Ω -14°	17.5Ω +12°	49.8Ω	50Ω
260	165Ω +7°	162Ω -8°	51.7Ω	52.2Ω
280	150Ω +11°	17.7 -14°	51.5Ω	51Ω
300	98Ω +42°	262Ω -41°	50.7Ω	50.8Ω
320	99Ω +40°	25Ω -38°	49.6Ω	49Ω
340	29Ω -41°	79Ω +50°	48.0Ω	50Ω
360	78Ω +46.8°	41Ω +43°	57.2*	56Ω*
380	43Ω -46°	82Ω +46°	47.3Ω	48Ω
400	45Ω +44°	56Ω -44°	50.7Ω	50.5Ω
420	67Ω -42°	35Ω +42°	48.4Ω	49Ω

Average Z_1 50.73 ohms.

Average $\sqrt{Z_{sc}Z_{oc}}$ 50.49 ohms.

RMS Deviation Z_1 1.62*

RMS Deviation $\sqrt{Z_{sc}Z_{oc}}$ 2.275*

* Signifies out of tolerance readings.

4.0 TEST PROCEDURES: (Continued)

Initial Satisfactory Performance Test — Date: 2-3-59

Test Specimen RAYTHEON 10-0879 — Test Engr: J. D. Lewis

Unit # 2A(30 ft) — Witness: Thomas T. Hamblin

Z_L RETEST — AF Insp: F. C. Walling

Para	Specification Requirement	Data
4.1.8.1.1	Specimen shall show electrical continuity.	Specimen shows continuity _____
4.1.8.1.2	The DC Resistance shall not exceed 0.002 ohms/foot.	Measured DC Resistance _____ ohms. Calculated DC Resistance _____ ohms/foot.
4.1.8.1.3	The insulation Resistance shall be no less than 100 megohms/ 100 feet.	Measured Insulation Resistance _____ megohms. Calculated Insulation Resistance _____ megohms/ 100 feet.
4.1.8.1.4	The Attenuation shall not exceed 4.2 db per 100 feet of length.	Measured Attenuation _____ db.
4.1.8.1.5	The Z_0 shall be 50 ± 3 ohms. The average Z_0 shall not differ from 50±3 ohms by more than 2.5%. The RMS deviation shall not be more than 3.0% of the average Z_0.	

Freq. Mcs.	Z_{sc}	Z_{oc}	$\sqrt{Z_{sc}Z_{oc}}$	Z_1
40	_____	_____	_____	50 Ω
60	_____	_____	_____	51 Ω
80	_____	_____	_____	52 Ω
100	_____	_____	_____	47.5 Ω
120	_____	_____	_____	51 Ω
140	_____	_____	_____	51.5 Ω
160	_____	_____	_____	49.5 Ω
180	_____	_____	_____	50.5 Ω

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4.0. TEST PROCEDURES: (Continued)

Initial Satisfactory Performance Test — Date: 3-3-59

Test Specimen RAYTHEON 10-081R — Test Engr J. D. Lively

Unit # 2A (Bot) — Witness Tom T. Hamilton

2. RETEST — AF Insp: R. O. Walling

Para	Specification Requirement	Data				
4.1.8.1.5 (Con't)	(Con't)	Freq. Mcs.	Z_{sc}	Z_{oc}	$\sqrt{Z_{sc}Z_{oc}}$	Z_1
		200				52 Ω
		220				49 Ω
		240				50 Ω
		260				52 Ω
		280				49.5 Ω
		300				49 Ω
		320				51 Ω
		340				50.5 Ω
		360				50 Ω
		380				50.5 Ω
		400				51.5 Ω
		420				47.5 Ω
		Average Z_1 50.32 ohms.				
		Average $\sqrt{Z_{sc}Z_{oc}}$ _____ ohms.				
		RMS Deviation Z_1 1.486				
		RMS Deviation $\sqrt{Z_{sc}Z_{oc}}$ _____				

* Signifies out of tolerance readings.

4.0 Test Procedures: (Continued)

Initial Satisfactory Performance Test — Date: 3-3-59

Test Specimen Amphenol 421-608 — Test Engr: J. D. Lynch

Unit # 2 (30 ft) — Witness: W. M. Purcell

AF Insp: F. G. Walling

Para	Specification Requirement	Data
4.1.8.2.1	The Velocity of propogation shall be 69.5 ± 0.5% C.	Cable Length (L) 30.0 feet. Resonant Frequency (F) 28.750 mcs. Number of 1/8 wavelengths in cable (N) 8 $V = \frac{F\,L}{1.23\,N} = 69.36\%$ C.
4.1.8.2.2	The Capacitance shall be 29.5 ± 1.5 muf/foot.	Measured Capacitance 901.60 muf. Calculated Capacitance 30.05 muf/foot.

* Signifies out of tolerance reading.

4.0 Test Procedures: (Continued)

Initial Satisfactory Performance Test — Date: 3-3-59

Test Specimen RAYTHEON 10-087A — Test Engr: J. D. Lively

Unit # 2A (30FT) — Witness: W. H. Powell

AF Insp: F. G. Walling

Para	Specification Requirement	Data
4.1.8.2.1	The Velocity of propogation shall be 69.5 ± 0.5% C.	Cable Length (L) 30.0 feet. Resonant Frequency (F) 23.550 mcs. Number of 1/8 wavelengths in cable (N) 12 $V = \frac{F\,L}{1.23\,N} = 71.82$ % C.*
4.1.8.2.2	The Capacitance shall be 29.5 ± 1.5 μμf/foot.	Measured Capacitance 864.6 μμf. Calculated Capacitance 28.82 μμf/foot.

* Signifies out of tolerance reading.

4.0 TEST PROCEDURES: (Continued)

Initial Satisfactory Performance Test — Date: 3-17-59

Test Specimen Amphenol 421-608 — Test Engr: Joe D. Lively

Unit # 3 (29.50 ft) — Witness: Jean T. Hamblin

AF Insp: F. G. Walling

Para	Specification Requirement	Data
4.1.8.3.1	The Capacitance shall be 29.5 ± 1.5 mmf/foot.	Measured capacitance 842.9 mmf. Calculated capacitance 28.57 mmf/foot.
4.1.8.3.2	The attenuation shall not exceed 4.2 db/100 feet.	Measured Attenuation 1.1 db. Calculated Attenuation 3.73 db/ 100 feet.
4.1.8.3.3	Measure Corona extinction voltage. Unit shall not breakdown with 10,000 V rms 60 cps applied.	Corona extinction voltage 4050 Volts.* Unit ~~does~~ does not exhibit breakdown characteristics.
4.1.8.3.4	Same as Para. 4.1.8.3.3. The capacitance shall not vary more than 0.5% from the value in Para. 4.1.8.3.1. The attenuation shall not exceed 4.2 db/100 feet.	Specimen Temp. / Capacitance Measured / Capacitance Calculated +25°C 843.5 mmf 28.59 mmf/foot. +200°C 854.3 mmf * 28.28 +25°C 844.6 mmf 28.63 -55°C 849.5 mmf * 28.80 +25°C 843.1 mmf 28.58 +200°C 850.8 mmf * 28.16 +25°C 842.0 mmf 28.54 -55°C 846.9 mmf 28.71 +25°C 841.4 mmf 28.52 +200°C 850.6 mmf * 28.16 +25°C 842.5 mmf 28.56 -55°C 846.8 mmf 28.71 +25°C 841.3 mmf 28.52

*Signifies out of tolerance reading.

CONNECTING CABLE = 258.3 mmf.

4.0 TEST PROCEDURES: (Continued)

Initial Satisfactory Performance Test

Test Specimen Amphenol 421-608

Unit # 3 (29.50 ft)

Date: 3-26-59

Test Engr: J. D. Lively

Witness: Lawrence T. Hamblin

AF Insp: F. G. Walling

Para	Specification Requirement	Data
4.1.8.3.4 (Con't)		Measured Attenuation ~~1.0~~ 1.20 db. (CVA 597) Calculated Attenuation 4.07 db/100 feet. Corona Extinction Voltage 3200 Volts. * Unit DOES NOT breakdown.
4.1.8.3.5	Same as Para. 4.1.8.3.2 and Para. 4.1.8.3.3	Measured Attenuation 1.0 db. Calculated Attenuation 3.39 db/100 feet. Corona Extinction Voltage 3200 Volts. * Unit DOES NOT breakdown.

* Signifies out of tolerance reading.

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4.0 TEST PROCEDURES: (Continued)

Initial Satisfactory Performance Test — Date: 3-17-59

Test Specimen Rectifier 10-087A — Test Engr: Jesse D. Lively

Unit # 3A (29.56 ft) — Witness: Thomas T. Hamblin

AF Insp: R. G. Walling

Para	Specification Requirement	Data
4.1.8.3.1	The Capacitance shall be 29.5 ± 1.5 mmf/foot.	Measured capacitance 894.5 mmf. Calculated capacitance 30.26 mmf/foot.
4.1.8.3.2	The attenuation shall not exceed 4.2 db/100 feet.	Measured Attenuation 1.15 db. Calculated Attenuation 3.89 db/ 100 feet.
4.1.8.3.3	Measure Corona extinction voltage. Unit shall not breakdown with 10,000 V rms 60 cps applied.	Corona extinction voltage 4000 Volts.* Unit ~~does~~ does not exhibit breakdown characteristics.
4.1.8.3.4	Same as Para. 4.1.8.3.3. The capacitance shall not vary more than 0.5% from the value in Para. 4.1.8.3.1. The attenuation shall not exceed 4.2 db/100 feet.	Specimen Temp. / Capacitance Measured / Capacitance Calculated +25°C — 894.9 mmf — 30.27 mmf/foot. +200°C — 877.0 mmf * — 29.50 +25°C — 892.2 mmf — 30.18 -55°C — 896.3 mmf — 30.33 +25°C — 897.6 mmf — 30.39 +200°C — 924.1 mmf * — 31.26 +25°C — 890.8 mmf — 30.14 -55°C — 899.0 mmf — 30.26 +25°C — 889.0 mmf * — 30.07 +200°C — 876.9 mmf * — 29.67 +25°C — 892.0 mmf — 30.18 -55°C — 893.0 mmf — 30.21 +25°C — 892.3 mmf — 30.19

*Signifies out of tolerance reading.
CONNECTING CABLE = 25Δ. 9 mmf.

4.0 TEST PROCEDURES: (Continued)

Initial Satisfactory Performance Test — Date: 3-26-59

Test Specimen RAYTHERM 10-087A — Test Engr: D. Lively

Unit # 3A (29.56 ft) — Witness: Leon T. Blankenship

AF Insp: F. C. Walling

Para	Specification Requirement	Data
4.1.8.3.4 (Con't)		Measured Attenuation 1.60 db. Calculated Attenuation 5.41 db/100 feet. * Corona Extinction Voltage 2000 Volts. * Unit DUGS breakdown, AT 2400 VOLTS. *
4.1.8.3.5	Same as Para. 4.1.8.3.2 and Para. 4.1.8.3.3	Measured Attenuation 1.60 db. Calculated Attenuation 5.41 db/100 feet. * Corona Extinction Voltage 2000 Volts. * Unit DOES breakdown, AT 2400 VOLTS. *

* Signifies out of tolerance reading.

UNIT ARCED AT 2400 VOLTS. BREAKDOWN WAS DUE TO BUBBLING OF THE DIELECTRIC WHILE AT +200°C. THE INNER CONDUCTOR ARCED TO THE JACKET THROUGH ONE OF THE AIR BUBBLES.

4.0 TEST PROCEDURES: (Continued)

Proof Cycle Test

Paragraph 4.1.9 PRIOR TO ENVIRONMENTAL TESTS

Test Specimen AMPHENOL 421-608

Unit # 2

Date: 3-5-59

Test Engr: J D Lively

Witness: [signature]

AF Insp: F. G. Walling

Para	Specification Requirement	Data
4.1.9.1	The specimen shall show electrical continuity	Specimen DOES show electrical continuity.
4.1.9.2	The insulation resistance shall be no less than 100 megohms/100 feet.	Measured Insulation Resistance >10 6 megohms. Calculated Insulation Resistance >10^6 megohms.
4.1.9.3	The capacitance shall be 29.5 ±1.5 μμf/ foot.	Measured Capacitance 901.8 μμf. Calculated Capacitance 30.6 μμf/ foot.
4.1.9.4	The attenuation shall not exceed 4.2 db/100 feet.	Measured Attenuation 1.1 db. Calculated Attenuation 3.67 db/ 100 feet.
4.1.9.5	The velocity of propogation shall be 69.5 ± 0.5% C.	Cable Length (L) 30.0 feet. Resonant Frequency (F) 28.7568 Mcs. Number of 1/8 wavelengths in cable (N) 8 $V \frac{FL}{1.23N}$ = 69.38 % C.
4.1.9.6	The Z_o shall be 50 ± 3.0 ohms.	Freq. Mcs. / Z_{oc} / Z_{sc} / $\sqrt{Z_{sc}Z_{oc}}$ / Z_1 225 / 122∠+74° / 125∠-78° / 45.9* Ω / 48.9 Ω

* Signifies out of tolerance readings.

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4.0 TEST PROCEDURES: (Continued)

Proof Cycle Test — Date: 2-5-59

Paragraph 4.6.9 PRIOR TO ENVIRONMENTAL TESTS — Test Engr: J. D. Lively

Witness: [illegible]

Test Specimen RAYTHEON 10-087A — AF Insp: F. G. Walling

Unit # 2A

Para	Specification Requirement	Data
4.1.9.1	The specimen shall show electrical continuity	Specimen DOES show electrical continuity.
4.1.9.2	The insulation resistance shall be no less than 100 megohms/100 feet.	Measured Insulation Resistance $>10^6$ megohms. Calculated Insulation Resistance $>10^6$ megohms.
4.1.9.3	The capacitance shall be 29.5 ±1.5 uuf/ foot.	Measured Capacitance 8653 uuf. Calculated Capacitance 28.84 uuf/ foot.
4.1.9.4	The attenuation shall not exceed 4.2 db/100 feet.	Measured Attenuation 1.2 db. Calculated Attenuation 4.0 db/ 100 feet.
4.1.9.5	The velocity of propogation shall be 69.5 ± 0.5% C.	Cable Length (L) 30.05 feet. Resonant Frequency (F) 23.5738 Mcs. Number of 1/8 wavelengths in cable (N) 8 $V = \frac{FL}{1.23N} = 71.99$ % C. *
4.1.9.6	The Z_o shall be 50 ± 3.0 ohms.	Freq. Mcs. / Z_{oc} / Z_{sc} / $\sqrt{Z_{sc}Z_{oc}}$ / Z_1 225 / 62Ω -79° / 35Ω +79° / 49.1Ω / 51.0Ω

* Signifies out of tolerance readings.

4.0 TEST PROCEDURES: (Continued)

Proof Cycle Test — Date: 3-6-59

Paragraph 4.5 After Completion of Rain Test — Test Engr: J. D. Lively

Witness: [illegible]

Test Specimen Amphenol 421-608 — AF Insp: F. O. Walling

Unit # 2

Para	Specification Requirement	Data
4.1.9.1	The specimen shall show electrical continuity	Specimen DOES show electrical continuity.
4.1.9.2	The insulation resistance shall be no less than 100 megohms/100 feet.	Measured Insulation Resistance $>10^6$ megohms. Calculated Insulation Resistance $>10^6$ megohms.
4.1.	The capacitance shall be 29.5 ±1.5 mmf/ foot.	Measured Capacitance 902.2 mmf. Calculated Capacitance 30.07 mmf/ foot.
4.1.9.4	The attenuation shall not exceed 4.2 db/100 feet.	Measured Attenuation 1.15 db. Calculated Attenuation 3.83 db/ 100 feet.
4.1.9.5	The velocity of propogation shall be 69.5 ± 0.5% C.	Cable Length (L) 30.0 feet. Resonant Frequency (F) 22.7544 Mcs. Number of 1/8 wavelengths in cable (N) 8 $V \frac{FL}{1.23N}$ = 69.37% C.
4.1.9.6	The Z_0 shall be 50 ± 3.0 ohms.	Freq. Mcs. / Z_{oc} / Z_{sc} / $\sqrt{Z_{sc}Z_{oc}}$ / Z_1 225 / 125Ω +75° / 173Ω -70° / 46.7* / 50.5Ω

* Signifies out of tolerance readings.

4.0 TEST PROCEDURES: (Continued)

Proof Cycle Test — Date: 3-6-59

Paragraph 4.5 After Completion of Rain Test — Test Engr: J. O. Lively

Witness: W. Powell

Test Specimen RAY THERM 10-087A — AF Insp: F. G. Walling

Unit # 2A

Para	Specification Requirement	Data
4.1.9.1	The specimen shall show electrical continuity	Specimen DOES show electrical continuity.
4.1.9.2	The insulation resistance shall be no less than 100 megohms/100 feet.	Measured Insulation Resistance $>10^6$ megohms. Calculated Insulation Resistance $>10^6$ megohms.
4.1.9.3	The capacitance shall be 29.5 ±1.5 uuf/ foot.	Measured Capacitance 865.9 uuf. Calculated Capacitance 28.86 uuf/ foot.
4.1.9.4	The attenuation shall not exceed 4.2 db/100 feet.	Measured Attenuation 4.1 db. Calculated Attenuation 3.67 db/ 100 feet.
4.1.9.5	The velocity of propogation shall be 69.5 ± 0.5% C.	Cable Length (L) 30.05 feet. Resonant Frequency (F) 23.5565 Mcs. Number of 1/8 wavelengths in cable (N) 8 $V = \frac{FL}{1.23N} = 71.93$ % C. *
4.1.9.6	The Z_0 shall be 50 ± 3.0 ohms.	Freq. Mcs. / Z_{oc} / Z_{sc} / $\sqrt{Z_{sc}Z_{oc}}$ / Z_1 225 / 71Ω -79° / 37Ω +79° / 51.3Ω / 52Ω

* Signifies out of tolerance readings.

4.0 TEST PROCEDURES: (Continued)

Proof Cycle Test

Paragraph 4.3 Heter Corrosion of Salt Atmosphere Test

Test Specimen Amphenol 421-608

Unit # 2

Date: 3-11-59

Test Engr: J. D. Lively

Witness: W. M. Randall

AF Insp: F. O. WALLING

Para	Specification Requirement	Data
4.1.9.1	The specimen shall show electrical continuity	Specimen DOES show electrical continuity.
4.1.9.2	The insulation resistance shall be no less than 100 megohms/100 feet.	Measured Insulation Resistance $>10^6$ megohms. Calculated Insulation Resistance $>10^6$ megohms.
4.1.9.3	The capacitance shall be 29.5 ±1.5 mmf/ foot.	Measured Capacitance 902.0 mmf. Calculated Capacitance 30.07 mmf/ foot.
4.1.9.4	The attenuation shall not exceed 4.2 db/100 feet.	Measured Attenuation 1.15 db. Calculated Attenuation 3.83 db/ 100 feet.
4.1.9.5	The velocity of propogation shall be 69.5 ± 0.5% C.	Cable Length (L) 30.0 feet. Resonant Frequency (F) 22.7576 Mcs. Number of 1/8 wavelengths in cable (N) 8 $V \frac{FL}{1.23N}$ = 69.38% C.
4.1.9.6	The Z_o shall be 50 ± 3.0 ohms.	Freq. Mcs. Z_{oc} Z_{sc} $\sqrt{Z_{sc}Z_{oc}}$ Z_1 225 137Ω -74° 17.9Ω +70° 48.9Ω 51.8Ω

* Signifies out of tolerance readings.

4.0 TEST PROCEDURES: (Continued)

Proof Cycle Test

Paragraph 4.3 After Completion of Salt Atmosphere Test

Test Specimen RAYTHERM 10-080A

Unit # 2A

Date: 3-11-59

Test Engr: J. D. Lively

Witness: [signature]

AF Insp: F. G. Walling

Para	Specification Requirement	Data
4.1.9.1	The specimen shall show electrical continuity	Specimen DOES show electrical continuity.
4.1.9.2	The insulation resistance shall be no less than 100 megohms/100 feet.	Measured Insulation Resistance $>10^6$ megohms. Calculated Insulation Resistance $>10^6$ megohms.
4.1.9.3	The capacitance shall be 29.5 ±1.5 mmf/ foot.	Measured Capacitance 865.4 mmf. Calculated Capacitance 28.85 mmf/ foot.
4.1.9.4	The attenuation shall not exceed 4.2 db/100 feet.	Measured Attenuation 1.1 db. Calculated Attenuation 3.67 db/ 100 feet.
4.1.9.5	The velocity of propogation shall be 69.5 ± 0.5% C.	Cable Length (L) 30.05 feet. Resonant Frequency (F) 23.5787 Mcs. Number of 1/8 wavelengths in cable (N) 8 $V \frac{FL}{1.23N}$ = 72.0 % C.*
4.1.9.6	The Z_o shall be 50 ± 3.0 ohms.	Freq. Mcs. / Z_{oc} / Z_{sc} / $\sqrt{Z_{sc}Z_{oc}}$ / Z_1 225 / 72.0∠-79° / 37.5∠+79° / 52.0Ω / 52.5Ω

* Signifies out of tolerance readings.

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4.0 TEST PROCEDURES: (Continued)

Proof Cycle Test — Date: 3-13-59

Paragraph 4.6 Humidity Combination of Sand and Dust Test — Test Engr: J. D. Lovick

Witness: [illegible]

Test Specimen Amphenol 421-608 — AF Insp: F. G. Walling

Unit # 2

Para	Specification Requirement	Data
4.1.9.1	The specimen shall show electrical continuity	Specimen DOES show electrical continuity.
4.1.9.2	The insulation resistance shall be no less than 100 megohms/100 feet.	Measured Insulation Resistance $>10^6$ megohms. Calculated Insulation Resistance $>10^6$ megohms.
4.1.9.3	The capacitance shall be 29.5 ±1.5 mmf/ foot.	Measured Capacitance 900.0 mmf. Calculated Capacitance 30.0 mmf/ foot.
4.1.9.4	The attenuation shall not exceed 4.2 db/100 feet.	Measured Attenuation 1.15 db. Calculated Attenuation 3.83 db/ 100 feet.
4.1.9.5	The velocity of propogation shall be 69.5 ± 0.5% C.	Cable Length (L) 30.0 feet. Resonant Frequency (F) 22.7745 Mcs. Number of 1/8 wavelengths in cable (N) 8 $V = \frac{FL}{1.23N} = 69.13$ % C.
4.1.9.6	The Z_o shall be 50 ± 3.0 ohms.	Freq. Mcs. / Z_{oc} / Z_{sc} / $\sqrt{Z_{sc}Z_{oc}}$ / Z_1 225 / 72∠-78° / 38∠+78° / 52.3Ω / 51.5Ω

* Signifies out of tolerance readings.

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4.0 TEST PROCEDURES: (Continued)

Proof Cycle Test — Date: 3-13-59

Paragraph 4.6 Meter Completion of Sand and Dust Test — Test Engr: Joe D Lively

Test Specimen RAYTHEON 10-0870 — Witness: [signature]

Unit # 2A — AF Insp: F. G. Walling

Para	Specification Requirement	Data
4.1.9.1	The specimen shall show electrical continuity	Specimen DOES show electrical continuity.
4.1.9.2	The insulation resistance shall be no less than 100 megohms/100 feet.	Measured Insulation Resistance $>10^6$ megohms. Calculated Insulation Resistance $>10^6$ megohms.
4.1.9.3	The capacitance shall be 29.5 ±1.5 mmf/ foot.	Measured Capacitance 866.5 mmf. Calculated Capacitance 28.83 mmf/ foot.
4.1.9.4	The attenuation shall not exceed 4.2 db/100 feet.	Measured Attenuation 1.1 db (CVA 597) Calculated Attenuation 3.67 db/ 100 feet.
4.1.9.5	The velocity of propogation shall be 69.5 ± 0.5% C.	Cable Length (L) 30.05 feet. Resonant Frequency (F) 23.5555 Mcs. Number of 1/8 wavelengths in cable (N) 8 $V \frac{FL}{1.23N}$ = 71.93 % C.*
4.1.9.6	The Z_o shall be 50 ± 3.0 ohms.	Freq. Mcs. / Z_{oc} / Z_{sc} / $\sqrt{Z_{sc}Z_{oc}}$ / Z_1 225 / 72∠78° / 38∠78° / 52.3Ω / 52.5Ω

* Signifies out of tolerance readings.

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4.0 TEST PROCEDURES: (Continued)

Proof Cycle Test — Date: 3 JUNE 1959

Paragraph 4.2.1.1 (a) INITIAL — Test Engr: [signature]

TEMP-ALT.-HUMIDITY TEST PROOF CYCLE — Witness: [signature]

Test Specimen AMPHENOL 421-608 — AF Insp: F. C. Walling

Unit # 8

Para	Specification Requirement	Data
4.1.9.1	The specimen shall show electrical continuity	Specimen DOES show electrical continuity.
4.1.9.2	The insulation resistance shall be no less than 100 megohms/100 feet.	Measured Insulation Resistance $>10^6$ megohms. Calculated Insulation Resistance $>10^6$ megohms.
4.1.9.3	The capacitance shall be 29.5 ±1.5 mmf/ foot.	Measured Capacitance ~~[illegible]~~ 880 DDL mmf. Calculated Capacitance ~~[illegible]~~ 30.24 DDL mmf/ foot.
4.1.9.4	The attenuation shall not exceed 4.2 db/100 feet.	Measured Attenuation 1.05 db. Calculated Attenuation 3.61 db/ 100 feet.
4.1.9.5	The velocity of propogation shall be 69.5 ± 0.5% C.	Cable Length (L) ~~[illegible]~~ 29.1 DDL feet. Resonant Frequency (F) ~~[illegible]~~ 23.4445 DDL Mcs. Number of 1/8 wavelengths in cable (N) 8 $V \frac{FL}{1.23N}$ = 69.3 % C.
4.1.9.6	The Z_o shall be 50 ± 3.0 ohms.	Freq. Mcs. / Z_{oc} / Z_{sc} / $\sqrt{Z_{sc}Z_{oc}}$ / Z_1 225 / 75Ω -34° / 32Ω +35° / 49.0Ω / 50.5Ω

* Signifies out of tolerance readings.

4.0 TEST PROCEDURES: (Continued)

Proof Cycle Test — Date: 3 JUNE 1957

Paragraph 4.2.1.1 (a) INITIAL — Test Engr: Don D. Smith

TEMP.-ALT.-HUMIDITY TEST PROOF CYCLE — Witness: Buford

Test Specimen RAYTHERM 10-082A — AF Insp: F. G. Walling

Unit # 2A

Para	Specification Requirement	Data
4.1.9.1	The specimen shall show electrical continuity	Specimen DOES show electrical continuity.
4.1.9.2	The insulation resistance shall be no less than 100 megohms/100 feet.	Measured Insulation Resistance $>10^6$ megohms. Calculated Insulation Resistance $>10^6$ megohms.
4.1.9.3	The capacitance shall be 29.5 ±1.5 mmf/ foot.	Measured Capacitance 855.6 mmf. Calculated Capacitance 28.52 mmf/ foot.
4.1.9.4	The attenuation shall not exceed 4.2 db/100 feet.	Measured Attenuation 1.15 db. Calculated Attenuation 3.85 db/ 100 feet.
4.1.9.5	The velocity of propogation shall be 69.5 ± 0.5% C.	Cable Length (L) 29.6 feet. Resonant Frequency (F) 23.9238 Mcs. Number of 1/8 wavelengths in cable (N) 8 $V \frac{FL}{1.23N}$ = 72.0 % C.*
4.1.9.6	The Z_o shall be 50 ± 3.0 ohms.	Freq. Mcs. / Z_{oc} / ddl / Z_{sc} / ddl / $\sqrt{Z_{sc} Z_{oc}}$ / Z_1 225 / 95.5Ω ~~-85.5°~~ +34.0° / ddl / 27.8Ω ~~+3°~~ -33.5° / 51.3Ω / 50.8Ω

* Signifies out of tolerance readings.

4.0 TEST PROCEDURES: (Continued)

Proof Cycle Test — Date: 8 JUNE 1959

Paragraph 4.2.1.1 (c) TEMP-ALT.- HUMIDITY TESTS AT -30°F FOLLOWING 3.44" H₂O — Test Engr: [signature]

Test Specimen AMPHENOL 421-608 — Witness: [signature]

Unit # 2 — AF Insp: F. C. Walling

Para	Specification Requirement	Data
4.1.9.1	The specimen shall show electrical continuity	Specimen DOES show electrical continuity.
4.1.9.2	The insulation resistance shall be no less than 100 megohms/100 feet.	Measured Insulation Resistance $> 10^6$ megohms. Calculated Insulation Resistance $> 10^6$ megohms.
4.1.9.3	The capacitance shall be 29.5 ±1.5 mmf/ foot.	Measured Capacitance 868 mmf. Calculated Capacitance 29.8 mmf/ foot.
4.1.9.4	The attenuation shall not exceed 4.2 db/100 feet.	Measured Attenuation .9 db. Calculated Attenuation 3.09 db/ 100 feet.
4.1.9.5	The velocity of propogation shall be 69.5 ± 0.5% C.	Cable Length (L) 29.1 feet. Resonant Frequency (F) 23.4196 Mcs. Number of 1/8 wavelengths in cable (N) 8 $V \frac{FL}{1.23N}$ = 69.3 % C.
4.1.9.6	The Z_o shall be 50 ± 3.0 ohms.	Freq. Mcs. / Z_{oc} / Z_{sc} / $\sqrt{Z_{sc}Z_{oc}}$ / Z_1 225 / 61.0Ω -81° / 38.0Ω +81° / 48.2Ω / 47.6Ω

* Signifies out of tolerance readings.

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4.0 TEST PROCEDURES: (Continued)

Proof Cycle Test — Date: 8 JUNE 1959

Paragraph 4.2.1.1(C) TEMP-ALT-HUMIDITY TESTS AT -30°F FOLLOWING 3.44"Hg — Test Engr: [signature]

Test Specimen RAYTHEAM 10-0871 — Witness: [signature]

Unit #2A — AF Insp: F. G. Walling

Para	Specification Requirement	Data
4.1.9.1	The specimen shall show electrical continuity	Specimen DOES show electrical continuity.
4.1.9.2	The insulation resistance shall be no less than 100 megohms/100 feet.	Measured Insulation Resistance $>10^6$ megohms. Calculated Insulation Resistance $>10^6$ megohms.
4.1.9.3	The capacitance shall be 29.5 ±1.5 mmf/ foot.	Measured Capacitance NOTE 1 mmf. Calculated Capacitance — mmf/ foot.
4.1.9.4	The attenuation shall not exceed 4.2 db/100 feet.	Measured Attenuation 1.4 db. Calculated Attenuation 4.73* db/ 100 feet.
4.1.9.5	The velocity of propogation shall be 69.5 ± 0.5% C.	Cable Length (L) 29.6 feet. Resonant Frequency (F) 23.8018 Mcs. Number of 1/8 wavelengths in cable (N) 8 $V \frac{FL}{1.23N}$ = 71.7 % C.
4.1.9.6	The Z_0 shall be 50 ± 3.0 ohms.	Freq Mcs. Z_{oc} Z_{sc} $\sqrt{Z_{sc}Z_{oc}}$ Z_1 225 ~~64.0 Ω -20°~~ 16.2 Ω -20° 50.8 Ω 47.0 Ω

Signifies out of tolerance readings.

NOTE 1: CONDENSATE FORMED INSIDE THE CABLE CONNECTORS, UPON DISCONNECTION AND RECONNECTION FOR VARIOUS TESTS, AND SHORTED ACROSS AT THE HIGH VOLTAGES OF SOME OF THE TESTS. UPON DISASSEMBLY, CLEANING AND REASSEMBLY OF THE CONNECTORS, THE CABLE PARAMETERS WERE FOUND TO HAVE REMAINED THE SAME AS PREVIOUS MEASUREMENTS.

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4.0 TEST PROCEDURES: (Continued)

Proof Cycle Test — Date: 9 June 1959

Paragraph 4.2.1.1 (C) Temp-Alt-Humidity Tests At -30°F During 1 mm of Hg — Test Engr: Don Hamilton

Test Specimen Amphenol 421-608 — AF Insp: F. O. Walling — Witness: Clifford

Unit # 2

Para	Specification Requirement	Data
4.1.9.1	The specimen shall show electrical continuity	Specimen DOES show electrical continuity.
4.1.9.2	The insulation resistance shall be no less than 100 megohms/100 feet.	Measured Insulation Resistance Note 1 megohms. Calculated Insulation Resistance — megohms.
4.1.9.3	The capacitance shall be 29.5 ±1.5 mmf/ foot.	Measured Capacitance 868 mmf. Calculated Capacitance 29.8 mmf/ foot.
4.1.9.4	The attenuation shall not exceed 4.2 db/100 feet.	Measured Attenuation .95 db. Calculated Attenuation 3% db/ 100 feet.
4.1.9.5	The velocity of propogation shall be 69.5 ± 0.5% C.	Cable Length (L) 29.1 feet. Resonant Frequency (F) 23.4131 Mcs. Number of 1/8 wavelengths in cable (N) 8 $V = \frac{FL}{1.23N} = 69.3$ % C.
4.1.9.6	The Z_o shall be 50 ± 3.0 ohms.	Freq. Mcs. / Z_{oc} / Z_{sc} / $\sqrt{Z_{sc}Z_{oc}}$ / Z_1 225 / 61.0Ω -81° / 38.0Ω +81° / 48.2Ω / 47.6Ω

* Signifies out of tolerance readings.

NOTE 1. UPON DISCONNECTION AND RECONNECTION FOR VARIOUS TESTS, CONDENSATE FORMED INSIDE THE CABLE CONNECTORS AND CAUSED A SHORT CIRCUIT AT THE HIGH VOLTAGES OF SOME OF THE TESTS. UPON DISASSEMBLY, CLEANING, AND REASSEMBLY OF THE CONNECTORS, THE CABLE PARAMETERS WERE FOUND TO HAVE REMAINED THE SAME AS PREVIOUS MEASUREMENTS.

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4.0 TEST PROCEDURES: (Continued)

Proof Cycle Test — Date: 9 JUNE 1959

Paragraph 4.2.1.1 (C) TEMP-ALT-HUMIDITY TESTS AT -30°F DURING 1mm Hg — Test Engr: Don Mansfield

Test Specimen RAYTHERM 10-082A — Witness: Ford

Unit # 2A — AF Insp: F. O. Welling

Para	Specification Requirement	Data
4.1.9.1	The specimen shall show electrical continuity	Specimen DOES show electrical continuity.
4.1.9.2	The insulation resistance shall be no less than 100 megohms/100 feet.	Measured Insulation Resistance NOTE 1 megohms. Calculated Insulation Resistance — megohms.
4.1.9.3	The capacitance shall be 29.5 ±1.5 mmf/ foot.	Measured Capacitance NOTE 1 mmf. Calculated Capacitance — mmf/ foot.
4.1.9.4	The attenuation shall not exceed 4.2 db/100 feet.	Measured Attenuation 1.1 db. Calculated Attenuation 3.72 db/ 100 feet.
4.1.9.5	The velocity of propogation shall be 69.5 ± 0.5% C.	Cable Length (L) 29.6 feet. Resonant Frequency (F) 23.7968 Mcs. Number of 1/8 wavelengths in cable (N) 8 $V \frac{FL}{1.23N}$ = 71.6* % C.
4.1.9.6	The Z_o shall be 50 ± 3.0 ohms.	Freq. Mcs. / Z_{oc} / Z_{sc} / $\sqrt{Z_{sc}Z_{oc}}$ / Z_1 225 / 161Ω +73° / 138Ω -75° / 47.1Ω / 47.0Ω

* Signifies out of tolerance readings.

NOTE 1: SEE PRECEDING DATA PAGE.

4.0 TEST PROCEDURES: (Continued)

Proof Cycle Test — Date: 10 JUNE 1959

Paragraph 4.2.1.1(d) TEMP.-ALT.- — Test Engr: [signature]

HUMIDITY TESTS AT +160°F FOLLOWING 3.44" OF H_6. — Witness: [signature]

Test Specimen AMPHENOL 421-608 — AF Insp: F. G. Walling

Unit # 2

Para	Specification Requirement	Data
4.1.9.1	The specimen shall show electrical continuity	Specimen DOES show electrical continuity.
4.1.9.2	The insulation resistance shall be no less than 100 megohms/100 feet.	Measured Insulation Resistance 500,000 megohms. Calculated Insulation Resistance 500,000 megohms.
4.1.9.3	The capacitance shall be 29.5 ±1.5 mmf/ foot.	Measured Capacitance 868 mmf. Calculated Capacitance 29.8 mmf/ foot.
4.1.9.4	The attenuation shall not exceed 4.2 db/100 feet.	Measured Attenuation 1.1 db. Calculated Attenuation 3.78 db/ 100 feet.
4.1.9.5	The velocity of propogation shall be 69.5 ± 0.5% C.	Cable Length (L) 29.1 feet. Resonant Frequency (F) 23.4823 Mcs. Number of 1/8 wavelengths in cable (N) 8 $V \frac{FL}{1.23N} = 69.4$ % C.
4.1.9.6	The Z_o shall be 50 ± 3.0 ohms.	Freq. Mcs. / Z_{oc} / Z_{sc} / $\sqrt{Z_{sc}Z_{oc}}$ / Z_1 225 / 83.0Ω-22° / 27.0Ω+77° / 47.4Ω / 47.6Ω

* Signifies out of tolerance readings.

4.0 TEST PROCEDURES: (Continued)

Proof Cycle Test — Date: 10 JUNE 1959

Paragraph 4.2.1.1(d) TEMP-ALT-HUMIDITY TESTS AT +160°F FLANGING 3.44" I/O — Test Engr: Don D. Smith

Test Specimen RAYTHERM 10-087A — Witness: F. C. Walling

Unit # 2A — AF Insp: F. C. Walling

Para	Specification Requirement	Data
4.1.9.1	The specimen shall show electrical continuity	Specimen DOES show electrical continuity.
4.1.9.2	The insulation resistance shall be no less than 100 megohms/100 feet.	Measured Insulation Resistance 130 ** megohms. Calculated Insulation Resistance ~~439~~ 38.5 megohms.
4.1.9.3	The capacitance shall be 29.5 ±1.5 uuf/ foot.	Measured Capacitance 855 uuf. Calculated Capacitance 28.9 uuf/ foot.
4.1.9.4	The attenuation shall not exceed 4.2 db/100 feet.	Measured Attenuation 1.3 db. Calculated Attenuation 4.39* db/ 100 feet.
4.1.9.5	The velocity of propogation shall be 69.5 ± 0.5% C.	Cable Length (L) 29.6 feet. Resonant Frequency (F) 23.9253 Mcs. Number of 1/8 wavelengths in cable (N) 8 $V \frac{FL}{1.23N}$ = 72.0* % C.
4.1.9.6	The Z_o shall be 50 ± 3.0 ohms.	Freq. Mcs. / Z_{oc} / Z_{sc} / $\sqrt{Z_{sc}Z_{oc}}$ / Z_1 225 / ~~25.5Ω -39°~~ 88Ω +79° / 26Ω -80° / 47.8Ω / 47.4Ω

* Signifies out of tolerance readings.
** LOW READING DUE MOISTURE IN CONNECTOR.

4.0 TEST PROCEDURES: (Continued)

Proof Cycle Test — Date: 11 JUNE 1959

Paragraph 4.2.1.1 (8) TEMP-ALT-HUMIDITY TESTS AT +160°F DURING IMM OF H_6 — Test Engr: [signature]

Test Specimen AMPHENOL 421-605 — Witness: [signature]

Unit # 2 — AF Insp: F. G. Walling

Para	Specification Requirement	Data
4.1.9.1	The specimen shall show electrical continuity	Specimen DOES show electrical continuity.
4.1.9.2	The insulation resistance shall be no less than 100 megohms/100 feet.	Measured Insulation Resistance 500,000 megohms. Calculated Insulation Resistance ~~150,000~~ megohms.
4.1.9.3	The capacitance shall be 29.5 ±1.5 mmf/ foot.	Measured Capacitance 868 mmf. Calculated Capacitance 29.8 mmf/ foot.
4.1.9.4	The attenuation shall not exceed 4.2 db/100 feet.	Measured Attenuation 1.1 db. Calculated Attenuation 3.78 db/ 100 feet.
4.1.9.5	The velocity of propogation shall be 69.5 ± 0.5% C.	Cable Length (L) 29.1 feet. Resonant Frequency (F) 23.4913 Mcs. Number of 1/8 wavelengths in cable (N) 8 $V \frac{FL}{1.23N}$ = 69.5 % C.
4.1.9.6	The Z_o shall be 50 ± 3.0 ohms.	Freq. Mcs. / Z_{oc} / Z_{sc} / $\sqrt{Z_{sc}Z_{oc}}$ / Z_1 225 / 95.0Ω -77° / 23.5Ω -76° / 47.4Ω / 47.0Ω

* Signifies out of tolerance readings.

4.0 TEST PROCEDURES: (Continued)

Proof Cycle Test — Date: 11 JUNE 1959

Paragraph 4.2.1.1(d) TEMP-ALT-HUMIDITY TESTS AT +160°F DURING 10TH OF 10 — Test Engr: [signature]

Test Specimen RAYTHEON 10-082A — Witness: [signature]

Unit # 2A — AF Insp: F. O. Welling

Para	Specification Requirement	Data
4.1.9.1	The specimen shall show electrical continuity	Specimen DOES show electrical continuity.
4.1.9.2	The insulation resistance shall be no less than 100 megohms/100 feet.	Measured Insulation Resistance 130 ** megohms. Calculated Insulation Resistance 38.5 megohms.
4.1.9.3	The capacitance shall be 29.5 ±1.5 mmf/ foot.	Measured Capacitance 855 mmf. Calculated Capacitance 28.9 mmf/ foot.
4.1.9.4	The attenuation shall not exceed 4.2 db/100 feet.	Measured Attenuation 1.3 db. Calculated Attenuation 4.39 * db/ 100 feet.
4.1.9.5	The velocity of propogation shall be 69.5 ± 0.5% C.	Cable Length (L) 29.6 feet. Resonant Frequency (F) 23.9468 Mcs. Number of 1/8 wavelengths in cable (N) 8 $V \frac{FL}{1.23N}$ = 72.1 * % C.
4.1.9.6	The Z_o shall be 50 ± 3.0 ohms.	Freq. Mcs. / Z_{oc} / Z_{sc} / $\sqrt{Z_{sc}Z_{oc}}$ / Z_1 225 / 76.0Ω+7.6° / 31.0Ω-7.6° / 48.3Ω / 48.3Ω

* Signifies out of tolerance readings.
** LOW READING DUE TO MOISTURE IN CONNECTOR.

4.0 TEST PROCEDURES: (Continued)

Proof Cycle Test — Date: 12 June 1959

Paragraph 4.2.1.1(e) Temp-Alt.-Humidity Test at 140°F w/ 95% Rel. Hum. — Test Engr: [signature]

Test Specimen Amphenol 421-008 — Witness: [signature]

Unit # 2 — AF Insp: F. O. Walling

Para	Specification Requirement	Data
4.1.9.1	The specimen shall show electrical continuity	Specimen DOES show electrical continuity.
4.1.9.2	The insulation resistance shall be no less than 100 megohms/100 feet.	Measured Insulation Resistance 20,000 megohms. Calculated Insulation Resistance 58,200 megohms. DAF.
4.1.9.3	The capacitance shall be 29.5 ±1.5 mmf/ foot.	Measured Capacitance 873 mmf. Calculated Capacitance 30.0 mmf/ foot.
4.1.9.4	The attenuation shall not exceed 4.2 db/100 feet.	Measured Attenuation 1.0 db. Calculated Attenuation 3.44 db/ 100 feet.
4.1.9.5	The velocity of propogation shall be 69.5 ± 0.5% C.	Cable Length (L) 29.1 feet. Resonant Frequency (F) 23.4528 Mcs. Number of 1/8 wavelengths in cable (N) 8 $V \frac{FL}{1.23N}$ = 69.4 % C.
4.1.9.6	The Z_o shall be 50 ± 3.0 ohms.	Freq. Mcs. Z_{oc} Z_{sc} $\sqrt{Z_{sc}Z_{oc}}$ Z_1 225 74Ω -78° 30.0Ω +78° 47.1Ω 47.9Ω

* Signifies out of tolerance readings.

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4.0 TEST PROCEDURES: (Continued)

Proof Cycle Test — Date: 12 JUNE 1959

Paragraph 4.2.1.1(e) TEMP-ALT-HUMIDITY TESTS AT +40°F W/95% REL HUM. — Test Engr: [illegible]

Test Specimen RAYTHERM 10-087A — Witness: [illegible]

Unit # 2A — AF Insp: F. G. Walling

Para	Specification Requirement	Data
4.1.9.1	The specimen shall show electrical continuity	Specimen DOES show electrical continuity.
4.1.9.2	The insulation resistance shall be no less than 100 megohms/100 feet.	Measured Insulation Resistance 200 ** megohms. Calculated Insulation Resistance ~~600~~ 59.2 megohms.
4.1.9.3	The capacitance shall be 29.5 ±1.5 mmf/ foot.	Measured Capacitance 86.6 mmf. Calculated Capacitance 29.3 mmf/ foot.
4.1.9.4	The attenuation shall not exceed 4.2 db/100 feet.	Measured Attenuation 1.1 db. Calculated Attenuation 3.71 db/ 100 feet.
4.1.9.5	The velocity of propogation shall be 69.5 ± 0.5% C.	Cable Length (L) 29.6 feet. Resonant Frequency (F) 23.8768 Mcs. Number of 1/8 wavelengths in cable (N) 8 $V \frac{FL}{1.23N}$ = 71.9 * % C.
4.1.9.6	The Z_0 shall be 50 ± 3.0 ohms.	Freq. Mcs. / Z_{oc} / Z_{sc} / $\sqrt{Z_{sc}Z_{oc}}$ / Z_1 225 / 208Ω +6.5° / 196Ω -6.6° / 47.0Ω / 48.3Ω

* Signifies out of tolerance readings.

** LOW READING DUE TO MOISTURE IN CONNECTOR

FORM NO A-702-1

4.0 TEST PROCELURES: (Continued)

Proof Cycle Test — Date: 15 JUNE 1959

Paragraph 4.2.1.1 (F) TEMP. -ALT.- — Test Engr: Don Dalgleish

HUMIDITY TESTS UNDER AMBIENT CONDITIONS — Witness: [illegible]

Test Specimen AMPHENOL 421-608 — AF Insp: F. C. Walling

Unit # 2

Para	Specification Requirement	Data
4.1.9.1	The specimen shall show electrical continuity	Specimen DOES show electrical continuity.
4.1.9.2	The insulation resistance shall be no less than 100 megohms/100 feet.	Measured Insulation Resistance 250,000 megohms. Calculated Insulation Resistance 72,800 megohms.
4.1.9.3	The capacitance shall be 29.5 ±1.5 μμf/ foot.	Measured Capacitance 870 μμf. Calculated Capacitance 29.9 μμf/ foot.
4.1.9.4	The attenuation shall not exceed 4.2 db/100 feet.	Measured Attenuation 1.1 db. Calculated Attenuation 3.78 db/ 100 feet.
4.1.9.5	The velocity of propogation shall be 69.5 ± 0.5% C.	Cable Length (L) 29.1 feet. Resonant Frequency (F) 23 47[illegible] Mcs. Number of 1/8 wavelengths in cable (N) 8 $V \frac{FL}{1.23N}$ = 69.4 % C.
4.1.9.6	The Z_0 shall be 50 ± 3.0 ohms.	Freq. Mcs. Z_{oc} Z_{sc} $\sqrt{Z_{sc} Z_{oc}}$ Z_1 225 $92\Omega - 31°$ $26\Omega + 34°$ 50.3Ω $51.2\Omega - 3.5°$

* Signifies out of tolerance readings.

4.0 TEST PROCEDURES: (Continued)

Proof Cycle Test — Date: 15 June 1959

Paragraph 4.2.1.1 (F) Temp-Alt - Humidity Test under Ambient Conditions — Test Engr: [signature]

Test Specimen Raytheon 10-052A — Witness: [signature]

Unit # 2A — AF Insp: F. C. Walling

Para	Specification Requirement	Data
4.1.9.1	The specimen shall show electrical continuity	Specimen Does show electrical continuity.
4.1.9.2	The insulation resistance shall be no less than 100 megohms/100 feet.	Measured Insulation Resistance 90,000 megohms. Calculated Insulation Resistance ~~304,000~~ 26,700 megohms. (597)
4.1.9.3	The capacitance shall be 29.5 ±1.5 uuf/ foot.	Measured Capacitance 863 uuf. Calculated Capacitance 29.2 uuf/ foot.
4.1.9.4	The attenuation shall not exceed 4.2 db/100 feet.	Measured Attenuation 4.2 db. Calculated Attenuation 4.06 db/ 100 feet.
4.1.9.5	The velocity of propogation shall be 69.5 ± 0.5% C.	Cable Length (L) 29.6 feet. Resonant Frequency (F) 23.8888 Mcs. Number of 1/8 wavelengths in cable (N) 8 $V \frac{FL}{1.23N}$ = 71.9 * % C.
4.1.9.6	The Z_o shall be 50 ± 3.0 ohms.	Freq. Mcs. / Z_{oc} / Z_{sc} / $\sqrt{Z_{sc}Z_{oc}}$ / Z_1 225 / 167 Ω +31.8° / 17.9 Ω -31° / 52.9 Ω / 52 Ω +2°

* Signifies out of tolerance readings.

4.0 TEST PROCEDURES: (Continued)

Proof Cycle Test — Date: 1 JULY '59

Paragraph 4.9 — Test Engr: J. C. [illegible]

BEFORE VIBRATION — Witness: [illegible]

Test Specimen RAYTHERM — AF Insp: F. G. Walling

Unit # 4

Para	Specification Requirement	Data
4.1.9.1	The specimen shall show electrical continuity	Specimen DOES show electrical continuity.
4.1.9.2	The insulation resistance shall be no less than 100 megohms/100 feet.	Measured Insulation Resistance 200,000 megohms. Calculated Insulation Resistance 6,660 megohms.
4.1.9.3	The capacitance shall be 29.5 ±1.5 mmf/ foot.	Measured Capacitance 97.0 mmf. Calculated Capacitance 29.7 mmf/ foot.
4.1.9.4	The attenuation shall not exceed 4.2 db/100 feet.	Measured Attenuation 0.10 db. Calculated Attenuation 3.00 db/ 100 feet.
4.1.9.5	The velocity of propogation shall be 69.5 ± 0.5% C.	Cable Length (L) 3.33 feet. Resonant Frequency (F) 102.5 Mcs. Number of 1/8 wavelengths in cable (N) 4 $V = \frac{FL}{1.25N} = 69.5$ % C.
4.1.9.6	The Z_o shall be 50 ± 3.0 ohms.	Freq. Mcs. / Z_{oc} / Z_{sc} / $\sqrt{Z_{sc}Z_{oc}}$ / Z_1 225 / 61 ∠70° / 41 ∠70° / *50.0 ∠0° / 50.0 ∠0°

* Signifies out of tolerance readings.

4.C TEST PROCEDURES: (Continued)

Proof Cycle Test — Date: 7 JULY '59

Paragraph 4.9 — Test Engr: J.C. Barnard

BEFORE VIBRATION — Witness: J. Russell

Test Specimen AMPHENOL 921-608 — AF Insp: F. O. Walling

Unit # 4

Para	Specification Requirement	Data
4.1.9.1	The specimen shall show electrical continuity	Specimen DOES show electrical continuity.
4.1.9.2	The insulation resistance shall be no less than 100 megohms/100 feet.	Measured Insulation Resistance ∞ megohms. Calculated Insulation Resistance ∞ megohms.
4.1.9.3	The capacitance shall be 29.5 ±1.5 mmf/ foot.	Measured Capacitance 103.0 mmf. Calculated Capacitance 29.4 mmf/ foot.
4.1.9.4	The attenuation shall not exceed 4.2 db/100 feet.	Measured Attenuation 0.10 db. Calculated Attenuation 2.86 db/ 100 feet.
4.1.9.5	The velocity of propogation shall be 69.5 ± 0.5% C.	Cable Length (L) 3.50 feet. Resonant Frequency (F) 97.5 Mcs. Number of 1/8 wavelengths in cable (N) 4 $V = \frac{FL}{1.25N}$ = 69.4 % C.
4.1.9.6	The Z_o shall be 50 ± 3.8 ohms.	Freq. Mcs. / Z_{oc} / Z_{sc} / $\sqrt{Z_{sc}Z_{oc}}$ / Z_i 225 / 31.0 ∠270° / 78.0 ∠90° / 49.2 ∠0° / 50. ∠0°

* Signifies out of tolerance readings.

4.0 TEST PROCEDURES: (Continued)

Proof Cycle Test — Date: 14 JULY '59

Paragraph 4.1.10.3 PROOF CYCLE — Test Engr: J.C. Barnard

BEFORE HEAT AGING — Witness: [illegible]

Test Specimen AMPHENOL 421-608 — AF Insp: F. O. Walling

Unit # 5

Para	Specification Requirement	Data
4.1.9.1	The specimen shall show electrical continuity	Specimen DOES show electrical continuity.
4.1.9.2	The insulation resistance shall be no less than 100 megohms/100 feet.	Measured Insulation Resistance 500,000 megohms. Calculated Insulation Resistance 10,400 megohms.
4.1.9.3	The capacitance shall be 29.5 ±1.5 mmf/ foot.	Measured Capacitance 60.0 mmf. Calculated Capacitance 28.8 mmf/ foot.
4.1.9.4	The attenuation shall not exceed 4.2 db/100 feet.	Measured Attenuation 0.050 db. Calculated Attenuation 2.40 db/ 100 feet.
4.1.9.5	The velocity of propogation shall be 69.5 ± 0.5% C.	Cable Length (L) 2.08 feet. Resonant Frequency (F) 325 Mcs. Number of 1/8 wavelengths in cable (N) 8 $V = \frac{F\,L}{1.23N} =$ 68.8 % C.
4.1.9.6	The Z_o shall be 50 ± 3.0 ohms.	Freq. Mcs. / Z_{oc} / Z_{sc} / $\sqrt{Z_{sc}Z_{oc}}$ / Z_1 225 / 16.5 ∠21 / 160 ∠21 / 51.4 ∠0° / 50 ∠0°

* Signifies out of tolerance readings.

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4.0 TEST PROCEDURES: (Continued)

Proof Cycle Test — Date: 14 JULY '59

Paragraph 4.1.10.3 PROOF CYCLE BEFORE HEAT AGING — Test Engr: R.C. Barnard

Witness: [illegible]

Test Specimen RAYTHERM 10-087A — AF Insp: F. O. Walling

Unit # 5

Para	Specification Requirement	Data
4.1.9.1	The specimen shall show electrical continuity	Specimen DOES show electrical continuity.
4.1.9.2	The insulation resistance shall be no less than 100 megohms/100 feet.	Measured Insulation Resistance 200,000 megohms. Calculated Insulation Resistance 4,160 megohms.
4.1.9.3	The capacitance shall be 29.5 ±1.5 mmf/ foot.	Measured Capacitance 59.0 mmf. Calculated Capacitance 28.40 mmf/ foot.
4.1.9.4	The attenuation shall not exceed 4.2 db/100 feet.	Measured Attenuation 0.050 db. Calculated Attenuation 2.40 db/ 100 feet.
4.1.9.5	The velocity of propogation shall be 69.5 ± 0.5% C.	Cable Length (L) 2.09 feet. Resonant Frequency (F) 331.0 Mcs. Number of 1/8 wavelengths in cable (N) 8 $V \frac{FL}{1.23N}$ = 71.4* % C.
4.1.9.6	The Z_o shall be 50 ± 3.0 ohms.	Freq. Mcs. / Z_{oc} / Z_{sc} / $\sqrt{Z_{sc}Z_{oc}}$ / Z_1 225 / 112 ∠0° / 104 ∠-12° / 70.0 ∠0° / 47.0 ∠0°

* Signifies out of tolerance readings.

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4.0 TEST PROCEDURES: (Continued)

Proof Cycle Test — Date: 15 JULY '59

Paragraph 4.1.10.4 PROOF CYCLE BEFORE COLD BEND TEST — Test Engr: J. C. Barnard

Test Specimen AMPHENOL 921-609 — Witness: W. Jones II

Unit # 6 — AF Insp: F. O. Walling

Para	Specification Requirement	Data
4.1.9.1	The specimen shall show electrical continuity	Specimen DOES show electrical continuity.
4.1.9.2	The insulation resistance shall be no less than 100 megohms/100 feet.	Measured Insulation Resistance 500,000 megohms. Calculated Insulation Resistance 12,500 megohms.
4.1.9.3	The capacitance shall be 29.5 ±1.5 mmf/ foot.	Measured Capacitance 123.0 mmf. Calculated Capacitance 29.6 mmf/ foot.
4.1.9.4	The attenuation shall not exceed 4.2 db/100 feet.	Measured Attenuation 0.10 db. Calculated Attenuation 2.91 db/ 100 feet.
4.1.9.5	The velocity of propogation shall be 69.5 ± 0.5% C.	Cable Length (L) 7.16 feet. Resonant Frequency (F) 162.2 Mcs. Number of 1/8 wavelengths in cable (N) 8 $V = \frac{F\,L}{1.23N}$ = 67.1 % C.
4.1.9.6	The Z_o shall be 50 ± 3.0 ohms.	Freq. Mcs. / Z_{oc} / Z_{sc} / $\sqrt{Z_{sc}Z_{oc}}$ / Z_1 225 / 56 ∠40° / 45.0 ∠40 / 50.1 ∠0° / 52 ∠0°

* Signifies out of tolerance readings.

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4.0 TEST PROCEDURES: (Continued)

Proof Cycle Test — Date: 15 JULY '54

Paragraph 4.1.10.4 PROOF CYCLE BEFORE COLD BEND TEST — Test Engr: J. C. Barnard

Test Specimen RAYTHEON 10-031A — Witness: [illegible]

Unit # 6 — AF Insp: F. O. Walling

Para	Specification Requirement	Data
4.1.9.1	The specimen shall show electrical continuity	Specimen DOES show electrical continuity.
4.1.9.2	The insulation resistance shall be no less than 100 megohms/100 feet.	Measured Insulation Resistance 20,000 megohms. Calculated Insulation Resistance 330.0 megohms.
4.1.9.3	The capacitance shall be 29.5 ±1.5 mmf/ foot.	Measured Capacitance 120.0 mmf. Calculated Capacitance 29.9 mmf/ foot.
4.1.9.4	The attenuation shall not exceed 4.2 db/100 feet.	Measured Attenuation 0.10 db. Calculated Attenuation 2.41 db/ 100 feet.
4.1.9.5	The velocity of propogation shall be 69.5 ± 0.5% C.	Cable Length (L) 4.16 feet. Resonant Frequency (F) 161.1 Mcs. Number of 1/8 wavelengths in cable (N) 8 $V \frac{FL}{1.23N}$ = 70.5* % C.
4.1.9.6	The Z_o shall be 50 ± 3.0 ohms.	Freq. Mcs. / Z_{oc} / Z_{sc} / $\sqrt{Z_{sc}Z_{oc}}$ / Z_1 225 / 54.0 -2° / 47.0 -1° / 50.4 -0° / 50.0 0°

* Signifies out of tolerance readings.

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4.0 TEST PROCEDURES: (Continued)

Proof Cycle Test — Date: 16 JULY '61

Paragraph 4.11.0.5 PROOF CYCLE BEFORE AGING STABILITY — Test Engr: [illegible]

Witness: [illegible]

Test Specimen AMPHENOL 721 [illegible] — AF Insp: F. O. Walling

Unit # 1

Para	Specification Requirement	Data
4.1.9.1	The specimen shall show electrical continuity	Specimen 1 OK show electrical continuity.
4.1.9.2	The insulation resistance shall be no less than 100 megohms/100 feet.	Measured Insulation Resistance 50,000 megohms. Calculated Insulation Resistance [illegible] megohms.
4.1.9.3	The capacitance shall be 29.5 ±1.5 μμf/ foot.	Measured Capacitance [illegible].0 μμf. Calculated Capacitance 29.6 μμf/ foot.
4.1.9.4	The attenuation shall not exceed 4.2 db/100 feet.	Measured Attenuation 0.120 db. Calculated Attenuation [illegible] db/ 100 feet.
4.1.9.5	The velocity of propogation shall be 69.5 ± 0.5% C.	Cable Length (L) 7.16 feet. Resonant Frequency (F) 16[illegible].6 Mcs. Number of 1/8 wavelengths in cable (N) [illegible] $V \frac{F L}{1.23N}$ = [illegible] % C.
4.1.9.6	The Z_o shall be 50 ± 3.0 ohms.	Freq. Mcs. Z_{oc} Z_{sc} $\sqrt{Z_{sc} Z_{oc}}$ Z_1 225. 55.0/-14° 45.0/11° 49.1/0° 51.0/0°

* Signifies out of tolerance readings.

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4.0 TEST PROCEDURES: (Continued)

Proof Cycle Test — Date: 16 [illegible] 1961

Paragraph 4.1.10.5 PROOF CYCLE — Test Engr: [illegible]

BEFORE AGING STABILITY — Witness: [illegible]

Test Specimen RAYTHEON 10-0019 — AF Insp: F. O. Walling

Unit # 1

Para	Specification Requirement	Data
4.1.9.1	The specimen shall show electrical continuity	Specimen DOES show electrical continuity.
4.1.9.2	The insulation resistance shall be no less than 100 megohms/100 feet.	Measured Insulation Resistance 200,000 megohms. Calculated Insulation Resistance [illegible] megohms.
4.1.9.3	The capacitance shall be 29.5 ±1.5 uuf/ foot.	Measured Capacitance [illegible] uuf. Calculated Capacitance [illegible] uuf/ foot.
4.1.9.4	The attenuation shall not exceed 4.2 db/100 feet.	Measured Attenuation [illegible] db. Calculated Attenuation [illegible] db/ 100 feet.
4.1.9.5	The velocity of propogation shall be 69.5 ± 0.5% C.	Cable Length (L) [illegible] feet. Resonant Frequency (F) [illegible] Mcs. Number of 1/8 wavelengths in cable (N) [illegible] $V \frac{FL}{1.23N}$ = [illegible]* % C.
4.1.9.6	The Z_o shall be 50 ± 3.0 ohms.	Freq. Mcs. / Z_{oc} / Z_{sc} / $\sqrt{Z_{sc} Z_{oc}}$ / Z_1 225 / [illegible] / [illegible] / [illegible] / [illegible]

* Signifies out of tolerance readings.

4.0 TEST PROCEDURES: (Continued)

Proof Cycle Test — Date: [illegible]

Paragraph 4.1.0.5 PROOF CYCLE BEFORE AGING STABILITY — Test Engr: [illegible]

Test Specimen AMPHENOL [illegible] — Witness:

Unit # 7 — AF Insp: F. C. Walling

Para	Specification Requirement	Data
4.1.9.1	The specimen shall show electrical continuity	Specimen DOES show electrical continuity.
4.1.9.2	The insulation resistance shall be no less than 100 megohms/100 feet.	Measured Insulation Resistance [illegible] megohms. Calculated Insulation Resistance [illegible] megohms.
4.1.9.3	The capacitance shall be 29.5 ±1.5 uuf/ foot.	Measured Capacitance [illegible] uuf. Calculated Capacitance [illegible] uuf/ foot.
4.1.9.4	The attenuation shall not exceed 4.2 db/100 feet.	Measured Attenuation [illegible] db. Calculated Attenuation [illegible] db/ 100 feet.
4.1.9.5	The velocity of propogation shall be 69.5 ± 0.5% C.	Cable Length (L) [illegible] feet. Resonant Frequency (F) [illegible] Mcs. Number of 1/8 wavelengths in cable (N) [illegible] $V \frac{FL}{1.23N}$ = [illegible] % C.
4.1.9.6	The Z_0 shall be 50 ± 3.0 ohms.	Freq. Mcs. Z_{oc} Z_{sc} $\sqrt{Z_{sc} Z_{oc}}$ Z_1 225 [illegible]

* Signifies out of tolerance readings.

4.0 TEST PROOF TESTS: (Continued)

Proof Cycle Test — Date: [illegible]

Paragraph 4.1.9.6 PROOF CYCLE — Test Engr: [illegible]

LEAKAGE AND ISOLATION — Witness: _____

Test Specimen [illegible] — AF Insp: F. G. Walling

Unit # 2

Para	Specification Requirement	Data
4.1.9.1	The specimen shall show electrical continuity	Specimen [illegible] show electrical continuity.
4.1.9.2	The insulation resistance shall be no less than 100 megohms/100 feet.	Measured Insulation Resistance [illegible] megohms. Calculated Insulation Resistance _____ megohms.
4.1.9.3	The capacitance shall be 29.5 ±1.5 uuf/ foot.	Measured Capacitance [illegible] uuf. Calculated Capacitance _____ uuf/ foot.
4.1.9.4	The attenuation shall not exceed 4.2 db/100 feet.	Measured Attenuation [illegible] db. Calculate: Attenuation _____ db/ 100 feet.
4.1.9.5	The velocity of propogation shall be 69.5 ± 0.5% C.	Cable Length (L) 4.16 feet. Resonant Frequency (F) [illegible] Mcs. Number of 1/8 wavelengths in cable (N) 2 $V \frac{FL}{1.23N}$ = [illegible]* % C.
4.1.9.6	The Z_o shall be 50 ± 3.0 ohms.	Freq. Mcs. Z_{oc} Z_{sc} $\sqrt{Z_{sc} Z_{oc}}$ Z_1 225 [illegible] [illegible] [illegible] [illegible]

* Signifies out of tolerance readings.

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4.0 TEST PROCEDURES: (Continued)

Proof Cycle Test — Date: [illegible]

Paragraph 4.1.10.5 PROOF CYCLE — Test Engr: [illegible]

LEAKAGE AND CAPACITY — Witness: _____

Test Specimen [illegible] — AF Insp: F. O. Walling

Unit # 1

Para	Specification Requirement	Data
4.1.9.1	The specimen shall show electrical continuity	Specimen _____ show electrical continuity.
4.1.9.2	The insulation resistance shall be no less than 100 megohms/100 feet.	Measured Insulation Resistance [illegible] megohms. Calculated Insulation Resistance 2,166 megohms.
4.1.9.3	The capacitance shall be 29.5 ±1.5 uuf/ foot.	Measured Capacitance _____ uuf. Calculated Capacitance _____ uuf/ foot.
4.1.9.4	The attenuation shall not exceed 4.2 db/100 feet.	Measured Attenuation [illegible] db. Calculated Attenuation [illegible] db/ 100 feet.
4.1.9.5	The velocity of propogation shall be 69.5 ± 0.5% C.	Cable Length (L) [illegible] feet. Resonant Frequency (F) _____ Mcs. Number of 1/8 wavelengths in cable (N) _____ $V = \frac{F\,L}{1.23N}$ = [illegible] % C.
4.1.9.6	The Z_o shall be 50 ± 3.0 ohms.	Freq. Mcs. Z_{oc} Z_{sc} $\sqrt{Z_{sc} Z_{oc}}$ Z_1 225 [illegible] [illegible] [illegible] [illegible]

* Signifies out of tolerance readings.

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4.0 TEST PROCEDURE: (Continued)

Proof Cycle Test — Date: JULY

Paragraph 4.4.10.5 PROOF VOLTAGE — Test Engr: [illegible]

BEFORE AND AFTER TEST — Witness: _____

Test Specimen [illegible] — AF Insp: F. G. Walling

Unit # _____

Para	Specification Requirement	Data
4.1.9.1	The specimen shall show electrical continuity	Specimen [illegible] show electrical continuity.
4.1.9.2	The insulation resistance shall be no less than 100 megohms/100 feet.	Measured Insulation Resistance [illegible] megohms. Calculated Insulation Resistance [illegible] megohms.
4.1.9.3	The capacitance shall be 29.5 ±1.5 uuf/ foot.	Measured Capacitance [illegible] uuf. Calculated Capacitance [illegible] uuf/ foot.
4.1.9.4	The attenuation shall not exceed 4.2 db/100 feet.	Measured Attenuation [illegible] db. Calculated Attenuation [illegible] db/ 100 feet.
4.1.9.5	The velocity of propogation shall be 69.5 ± 0.5% C.	Cable Length (L) 4-11 feet. Resonant Frequency (F) [illegible] Mcs. Number of 1/8 wavelengths in cable (N) [illegible] $V = \frac{F\,L}{1.23N} =$ [illegible]* % C.
4.1.9.6	The Z_o shall be 50 ± 3.0 ohms.	Freq. Mcs. Z_{oc} Z_{sc} $\sqrt{Z_{sc} Z_{oc}}$ Z_1 225 [illegible] [illegible] [illegible] [illegible]

* Signifies out of tolerance readings.

4.0 TEST PROCEDURES: (Continued)

Proof Cycle Test — Date: [illegible]

Paragraph 4.1.10.4 PROOF CYCLE — Test Engr: [illegible]

AFTER COLD END TEST — Witness: _____

Test Specimen [illegible] — AF Insp: F. G. Walling

Unit # [illegible]

Para	Specification Requirement	Data
4.1.9.1	The specimen shall show electrical continuity	Specimen [illegible] show electrical continuity.
4.1.9.2	The insulation resistance shall be no less than 100 megohms/100 feet.	Measured Insulation Resistance [illegible] megohms. Calculated Insulation Resistance [illegible] megohms.
4.1.9.3	The capacitance shall be 29.5 ±1.5 uuf/ foot.	Measured Capacitance [illegible] uuf. Calculated Capacitance [illegible] uuf/ foot.
4.1.9.4	The attenuation shall not exceed 4.2 db/100 feet.	Measured Attenuation [illegible] db. Calculated Attenuation [illegible] db/ 100 feet.
4.1.9.5	The velocity of propogation shall be 69.5 ± 0.5% C.	Cable Length (L) [illegible] feet. Resonant Frequency (F) [illegible] Mcs. Number of 1/8 wavelengths in cable (N) _____ $V = \frac{F\,L}{1.23N}$ = [illegible] % C.
4.1.9.6	The Z_o shall be 50 ± 3.0 ohms.	Freq. Mcs. Z_{oc} Z_{sc} $\sqrt{Z_{sc} Z_{oc}}$ Z_1 225 [illegible]

* Signifies out of tolerance readings.

4.0 TEST PROCEDURES: (Continued)

Proof Cycle Test — Date: 14 JULY 59

Paragraph 4.1.10.1 PROOF CYCLE — Test Engr: [illegible]

AFTER COLD BEND TEST — Witness:

Test Specimen RAYTHEON 10-C-2A — AF Insp: F. C. Walling

Unit # 6

Para	Specification Requirement	Data
4.1.9.1	The specimen shall show electrical continuity	Specimen 1 CKT show electrical continuity.
4.1.9.2	The insulation resistance shall be no less than 100 megohms/100 feet.	Measured Insulation Resistance 10,000 megohms. Calculated Insulation Resistance 6,240 megohms.
4.1.9.3	The capacitance shall be 29.5 ±1.5 mmf/ foot.	Measured Capacitance 1,200 mmf. Calculated Capacitance 29.1 mmf/ foot.
4.1.9.4	The attenuation shall not exceed 4.2 db/100 feet.	Measured Attenuation 0.10 db. Calculated Attenuation 2.41 db/ 100 feet.
4.1.9.5	The velocity of propogation shall be 69.5 ± 0.5% C.	Cable Length (L) 414 feet. Resonant Frequency (F) 14.3 Mcs. Number of 1/8 wavelengths in cable (N) 3 $V \frac{FL}{1.23N}$ = 16.3* % C.
4.1.9.6	The Z_o shall be 50 ± 3.0 ohms.	Freq. Mcs. Z_{oc} Z_{sc} $\sqrt{Z_{sc} Z_{oc}}$ λ_1 225 1.0 E+6 10.0 E+6 [illegible] 51.0 [illegible]

* Signifies out of tolerance readings.

4.0 TEST PROCEDURES: (Continued)

Proof Cycle Test — Date: 25 JULY '57

Paragraph 4.1.10.3 PROOF CYCLE AFTER HEAT AGING — Test Engr: J. C. Lo and

Witness:

Test Specimen AMPHENOL 421-609 — AF Insp: F. C. Halling

Unit # 5

Para	Specification Requirement	Data
4.1.9.1	The specimen shall show electrical continuity	Specimen DOES show electrical continuity.
4.1.9.2	The insulation resistance shall be no less than 100 megohms/100 feet.	Measured Insulation Resistance 100,000 megohms. Calculated Insulation Resistance 2,050 megohms.
4.1.9.3	The capacitance shall be 29.5 ±1.5 mmf/ foot.	Measured Capacitance 58.5 mmf. Calculated Capacitance 28.0 mmf/ foot.
4.1.9.4	The attenuation shall not exceed 4.2 db/100 feet.	Measured Attenuation 0.50 db. Calculated Attenuation 24.0* db/ 100 feet.
4.1.9.5	The velocity of propogation shall be 69.5 ± 0.5% C.	Cable Length (L) 2.09 feet. Resonant Frequency (F) 361.0 Mcs. Number of 1/8 wavelengths in cable (N) 8 $V = \frac{FL}{1.23N} =$ 16.5* % C.
4.1.9.6	The Z_o shall be 50 ± 3.0 ohms.	Freq. Mcs. / Z_{oc} / Z_{sc} / $\sqrt{Z_{sc}Z_{oc}}$ / Z_1 225 / 18.0 ∠-20° / 145.0 ∠-120° / 51.0 ∠0° / 51.0 ∠0°

* Signifies out of tolerance readings.

4.0 TEST PROCEDURES: (Continued)

Proof Cycle Test — Date: 21 JULY '57

Paragraph 4.1.10.5 PROOF CYCLE AFTER AGING STABILITY — Test Engr: [illegible]

Test Specimen A. PHENOL 4-1 60Ω — Witness: _____

Unit # 1 — AF Insp: F. G. Walling

Para	Specification Requirement	Data
4.1.9.1	The specimen shall show electrical continuity	Specimen DOES show electrical continuity.
4.1.9.2	The insulation resistance shall be no less than 100 megohms/100 feet.	Measured Insulation Resistance 100,000 megohms. Calculated Insulation Resistance 7,160 megohms.
4.1.9.3	The capacitance shall be 29.5 ±1.5 mmf/ foot.	Measured Capacitance 118.0 mmf. Calculated Capacitance 28.7 mmf/ foot.
4.1.9.4	The attenuation shall not exceed 4.2 db/100 feet.	Measured Attenuation 0.50 db. Calculated Attenuation 1.0* db/ 100 feet.
4.1.9.5	The velocity of propogation shall be 69.5 ± 0.5% C.	Cable Length (L) 9.16 feet. Resonant Frequency (F) 165.12 Mcs. Number of 1/8 wavelengths in cable (N) 2 $V = \frac{F L}{1.23N}$ = 67.0 % C.
4.1.9.6	The Z_o shall be 50 ± 3.0 ohms.	Freq. Mcs. / Z_{oc} / Z_{sc} / $\sqrt{Z_{sc}Z_{oc}}$ / Z_1 225 / 41.0 ∠21° / 59.0 ∠21° / 50. ∠0° / 51.0 ∠0°

* Signifies out of tolerance readings.

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4.0 TEST PROCEDURES: (Continued)

Proof Cycle Test

Date: [illegible] JULY '57

Paragraph 4.1.10.5 PROOF CYCLE AFTER AGING STABILITY

Test Engr: [illegible]

Witness: [illegible]

Test Specimen RAYTHEON [illegible] 10-C[illegible]

AF Insp: F. G. Walling

Unit # 1

Para	Specification Requirement	Data
4.1.9.1	The specimen shall show electrical continuity	Specimen DOES show electrical continuity.
4.1.9.2	The insulation resistance shall be no less than 100 megohms/100 feet.	Measured Insulation Resistance [illegible],000 megohms. Calculated Insulation Resistance [illegible] megohms.
4.1.9.3	The capacitance shall be 29.5 ±1.5 uuf/ foot.	Measured Capacitance [illegible] uuf. Calculated Capacitance 30.[illegible] uuf/ foot.
4.1.9.4	The attenuation shall not exceed 4.2 db/100 feet.	Measured Attenuation 0.40 db. Calculated Attenuation [illegible].61* db/ 100 feet.
4.1.9.5	The velocity of propogation shall be 69.5 ± 0.5% C.	Cable Length (L) [illegible].16 feet. Resonant Frequency (F) 16[illegible] Mcs. Number of 1/8 wavelengths in cable (N) [illegible] $V = \frac{F\ L}{1.23N}$ = [illegible] % C.
4.1.9.6	The Z_o shall be 50 ± 3.0 ohms.	Freq. Mcs. / Z_{oc} / Z_{sc} / $\sqrt{Z_{sc} Z_{oc}}$ / Z_1 225 / [illegible] / [illegible] / [illegible] / [illegible]

* Signifies out of tolerance readings.

4.0 TEST PROCELURES: (Continued)

Proof Cycle Test — Date: [illegible]

Paragraph 4.6.10.5 PROOF [illegible] — Test Engr: [illegible]

SPIEK [illegible] STAMP [illegible] — Witness: [illegible]

Test Specimen AN/HPN-1 [illegible] — AF Insp: F. O. Walling

Unit # 2

Para	Specification Requirement	Data
4.1.9.1	The specimen shall show electrical continuity	Specimen DOE, show electrical continuity.
4.1.9.2	The insulation resistance shall be no less than 100 megohms/100 feet.	Measured Insulation Resistance 100,000 megohms. Calculated Insulation Resistance 4,100 megohms.
4.1.9.3	The capacitance shall be 29.5 ±1.5 mmf/ foot.	Measured Capacitance [illegible] mmf. Calculated Capacitance [illegible] mmf/ foot.
4.1.9.4	The attenuation shall not exceed 4.2 db/100 feet.	Measured Attenuation [illegible] db. Calculated Attenuation [illegible] db/ 100 feet.
4.1.9.5	The velocity of propogation shall be 69.5 ± 0.5% C.	Cable Length (L) [illegible] feet. Resonant Frequency (F) [illegible] Mcs. Number of 1/8 wavelengths in cable (N) [illegible] $V \frac{FL}{1.23N}$ = [illegible] % C.
4.1.9.6	The Z_o shall be 50 ± 3.0 ohms.	Freq. Mcs. Z_{oc} Z_{sc} $\sqrt{Z_{sc}Z_{oc}}$ Z_1 225 [illegible] [illegible] [illegible] [illegible]

* Signifies out of tolerance readings.

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4.0 TEST PROCEDURES: (Continued)

Proof Cycle Test — Date: 21 JULY '59

Paragraph 4.1.10.5 PROOF CYCLE — Test Engr: [illegible]

AFTER AGING STABILITY — Witness: [illegible]

Test Specimen RAYTHEON 10 [illegible] — AF Insp: F. O. Walling

Unit # [illegible]

Para	Specification Requirement	Data
4.1.9.1	The specimen shall show electrical continuity	Specimen ONE show electrical continuity.
4.1.9.2	The insulation resistance shall be no less than 100 megohms/100 feet.	Measured Insulation Resistance 50,000 megohms. Calculated Insulation Resistance 4300 megohms.
4.1.9.3	The capacitance shall be 29.5 ±1.5 mmf/ foot.	Measured Capacitance 1.95 mmf. Calculated Capacitance 30.3 mmf/ foot.
4.1.9.4	The attenuation shall not exceed 4.2 db/100 feet.	Measured Attenuation 0.45 db. Calculated Attenuation 4.61* db/ 100 feet.
4.1.9.5	The velocity of propogation shall be 69.5 ± 0.5% C.	Cable Length (L) 4.16 feet. Resonant Frequency (F) 45.6 Mcs. Number of 1/8 wavelengths in cable (N) 3 $V \frac{FL}{1.23N}$ = 69.1 % C.
4.1.9.6	The Z_o shall be 50 ± 3.0 ohms.	Freq. Mcs. / Z_{oc} / Z_{sc} / $\sqrt{Z_{sc}Z_{oc}}$ / Z_1 225 / 40.0 ∠39° / 41.0 ∠-37° / 40.5* ∠0° / 46.0 ∠2-35

* Signifies out of tolerance readings.

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4.0 TEST PROCEDURES: (Continued)

Proof Cycle Test — Date: 21 JULY '57

Paragraph 4.1.10.5 PROOF CYCLE AFTER AGING STABILITY — Test Engr: [illegible]

Witness: _____

Test Specimen AMPHENOL 421-604 — AF Insp: F. G. Walling

Unit # 9

Para	Specification Requirement	Data
4.1.9.1	The specimen shall show electrical continuity	Specimen DCE show electrical continuity.
4.1.9.2	The insulation resistance shall be no less than 100 megohms/100 feet.	Measured Insulation Resistance 65,000 megohms. Calculated Insulation Resistance 2,560 megohms.
4.1.9.3	The capacitance shall be 29.5 ±1.5 mmf/ foot.	Measured Capacitance 117.6 mmf. Calculated Capacitance 29.6 mmf/ foot.
4.1.9.4	The attenuation shall not exceed 4.2 db/100 feet.	Measured Attenuation 0.50 db. Calculated Attenuation 1.0* db/ 100 feet.
4.1.9.5	The velocity of propogation shall be 69.5 ± 0.5% C.	Cable Length (L) 1.16 feet. Resonant Frequency (F) 167.16 Mcs. Number of 1/8 wavelengths in cable (N) 5 $V = \frac{F\,L}{1.23N}$ = 67.6 % C.
4.1.9.6	The Z_o shall be 50 ± 3.0 ohms.	Freq. Mcs. / Z_{oc} / Z_{sc} / $\sqrt{Z_{sc}Z_{oc}}$ / Z_1 225 / [illegible] / 3.0 ∠ 1° / 4.5 ∠ 0° / 0.0 ∠ 0°

* Signifies out of tolerance readings.

4.0 TEST PROCEDURES: (Continued)

Proof Cycle Test — Date: [illegible]

Paragraph 4.1.10.3 PROOF CYCLE — Test Engr: [illegible]

AFTER ARCING FAILURE — Witness: _____

Test Specimen RAYTHEON 10-[illegible] — AF Insp: F. G. Walling

Unit # 1

Para	Specification Requirement	Data
4.1.9.1	The specimen shall show electrical continuity	Specimen [illegible] show electrical continuity.
4.1.9.2	The insulation resistance shall be no less than 100 megohms/100 feet.	Measured Insulation Resistance [illegible] megohms. Calculated Insulation Resistance [illegible] megohms.
4.1.9.3	The capacitance shall be 29.5 ±1.5 mmf/ foot.	Measured Capacitance [illegible] mmf. Calculated Capacitance [illegible] mmf/ foot.
4.1.9.4	The attenuation shall not exceed 4.2 db/100 feet.	Measured Attenuation [illegible] db. Calculated Attenuation [illegible]* db/ 100 feet.
4.1.9.5	The velocity of propogation shall be 69.5 ± 0.5% C.	Cable Length (L) [illegible] feet. Resonant Frequency (F) [illegible] Mcs. Number of 1/8 wavelengths in cable (N) [illegible] $V = \frac{F\,L}{1.23N}$ = [illegible] % C.
4.1.9.6	The Z_o shall be 50 ± 3.0 ohms.	Freq. Mcs. / Z_{oc} / Z_{sc} / $\sqrt{Z_{sc}Z_{oc}}$ / Z_1 225 [illegible] [illegible] [illegible] [illegible]

* Signifies out of tolerance readings.

4.0 TEST PROCEDURES: (Continued)

Proof Cycle Test — Date: [illegible]

Paragraph 4.1.10.6 [illegible] — Test Engr: [illegible]

AFTER PROOF TEST — Witness: _____

Test Specimen AMPHENOL [illegible] — AF Insp: F. G. Walling

Unit # [illegible]

Para	Specification Requirement	Data
4.1.9.1	The specimen shall show electrical continuity	Specimen [illegible] show electrical continuity.
4.1.9.2	The insulation resistance shall be no less than 100 megohms/100 feet.	Measured Insulation Resistance [illegible] megohms. Calculated Insulation Resistance _____ megohms.
4.1.9.3	The capacitance shall be 29.5 ±1.5 uuf/ foot.	Measured Capacitance _____ uuf. Calculated Capacitance [illegible] uuf/ foot.
4.1.9.4	The attenuation shall not exceed 4.2 db/100 feet.	Measured Attenuation [illegible] db. Calculated Attenuation [illegible] db/ 100 feet.
4.1.9.5	The velocity of propogation shall be 69.5 ± 0.5% C.	Cable Length (L) [illegible] feet. Resonant Frequency (F) [illegible] Mcs. Number of 1/8 wavelengths in cable (N) _____ $V \frac{FL}{1.23N}$ = _____* % C.
4.1.9.6	The Z_o shall be 50 ± 3.0 ohms.	Freq. Mcs. / Z_{oc} / Z_{sc} / $\sqrt{Z_{sc}Z_{oc}}$ / Z_1 225 [illegible]

* Signifies out of tolerance readings.

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4.0 TEST PROCEDURES: (Continued)

Proof Cycle Test — Date: [illegible]

Paragraph 4.1.10.6 PROOF [illegible] — Test Engr: [illegible]

AFTER F[illegible] TEST — Witness: [illegible]

Test Specimen RAYTHEON [illegible] — AF Insp: F. G. Walling

Unit # 10

Para	Specification Requirement	Data
4.1.9.1	The specimen shall show electrical continuity	Specimen [illegible] show electrical continuity.
4.1.9.2	The insulation resistance shall be no less than 100 megohms/100 feet.	Measured Insulation Resistance [illegible] megohms. Calculated Insulation Resistance [illegible] megohms.
4.1.9.3	The capacitance shall be 29.5 ±1.5 mmf/ foot.	Measured Capacitance [illegible] mmf. Calculated Capacitance [illegible] mmf/ foot.
4.1.9.4	The attenuation shall not exceed 4.2 db/100 feet.	Measured Attenuation [illegible] db. Calculated Attenuation [illegible] db/ 100 feet.
4.1.9.5	The velocity of propogation shall be 69.5 ± 0.5% C.	Cable Length (L) [illegible] feet. Resonant Frequency (F) [illegible] Mcs. Number of 1/8 wavelengths in cable (N) [illegible] $V = \frac{F\,L}{1.23N} =$ [illegible] % C.
4.1.9.6	The Z_o shall be 50 ± 3.0 ohms.	Freq. Mcs. Z_{oc} Z_{sc} $\sqrt{Z_{sc}Z_{oc}}$ Z_1 225 [illegible] [illegible] [illegible] [illegible]

* Signifies out of tolerance readings.

FORM NO A-782-1

4.0 TEST PROCEDURES: (Continued)

Proof Cycle Test — Date: 5 August 1961

Paragraph 4.6.1 AND 4.1 — Test Engr: [illegible]

FOLLOWING DE VIBRATION AND SHOCK — Witness: [illegible]

Test Specimen AMPHENOL 121-028 — AF Insp: F. G. Walling

Unit # 4

Para	Specification Requirement	Data
4.1.9.1	The specimen shall show electrical continuity	Specimen 1 2E show electrical continuity.
4.1.9.2	The insulation resistance shall be no less than 100 megohms/100 feet.	Measured Insulation Resistance ~~20,000~~ megohms. 16,700 (OUA 597) Calculated Insulation Resistance ~~[illegible]~~ megohms.
4.1.9.3	The capacitance shall be 29.5 ±1.5 uuf/ foot.	Measured Capacitance 12 uuf. Calculated Capacitance 21.4 uuf/ foot.
4.1.9.4	The attenuation shall not exceed 4.2 db/100 feet.	Measured Attenuation .1 db. Calculated Attenuation 4.1 db/ 100 feet.
4.1.9.5	The velocity of propogation shall be 69.5 ± 0.5% C.	Cable Length (L) [illegible] feet. Resonant Frequency (F) 11.341 Mcs. Number of 1/8 wavelengths in cable (N) 4 $V \frac{FL}{1.23N}$ = [illegible] % C.
4.1.9.6	The Z_o shall be 50 ± 3.0 ohms.	Freq. Mcs. / Z_{oc} / Z_{sc} / $\sqrt{Z_{sc} Z_{oc}}$ / Z_1 — 225 / [illegible] / [illegible] / 47.1 / 47.5

* Signifies out of tolerance readings.

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4.0 TEST PROCEDURES: (Continued)

Proof Cycle Test — Date: AUGUST 1957

Paragraph 4.7.1 AND 4.7 — Test Engr: [signature]

FOLLOWING VIBRATION AND SHOCK — Witness: [signature]

Test Specimen KAITHERM 10-0X7A — AF Insp: F. O. Walling

Unit # 4

Para	Specification Requirement	Data
4.1.9.1	The specimen shall show electrical continuity	Specimen DOES show electrical continuity.
4.1.9.2	The insulation resistance shall be no less than 100 megohms/100 feet.	Measured Insulation Resistance 50,000 megohms. Calculated Insulation Resistance 50000 megohms.
4.1.9.3	The capacitance shall be 29.5 ±1.5 mmf/ foot.	Measured Capacitance 100 mmf. Calculated Capacitance 29.4 mmf/ foot.
4.1.9.4	The attenuation shall not exceed 4.2 db/100 feet.	Measured Attenuation .1 db. Calculated Attenuation 2.1 db/ 100 feet.
4.1.9.5	The velocity of propogation shall be 69.5 ± 0.5% C.	Cable Length (L) 4 feet. Resonant Frequency (F) 101.11 Mcs. Number of 1/8 wavelengths in cable (N) 4 $V \frac{FL}{1.23N}$ = 70.0 % C.
4.1.9.6	The Z_o shall be 50 ± 3.0 ohms.	Freq. Mcs. Z_{oc} Z_{sc} $\sqrt{Z_{sc}Z_{oc}}$ Z_1 225 [illegible] [illegible] [illegible] [illegible]

* Signifies out of tolerance readings.

FORM NO A-702-1

CONVAIR - ASTRONAUTICS

INTRA-COMPANY CORRESPONDENCE

DATE 18 May 1959

TO : J. D. Lively, Department 532-1

FROM : G. J. Goble, Department 532-5

SUBJECT : Aluminum Jacket R.F. Cable Qualification - Fungi Test (T.N. 7A 2065)

Two coils of aljax cable were submitted for fungi testing in accordance with Convair Specification No. 27-09422. This calls for the preparation of a spore suspension of the following fungi:

Myrothecium verrucaria
Rhizopus nigricans
Aspergillus flavus
Penicillium citrinum
Fusarium moniliforme

Prior to mixing this suspension each culture was checked microscopically for the presence of spores. These were found to be present in large numbers and they were checked to see that the spores present were of the correct size, shape and color.

Spraying was done so as to leave a heavy deposit of very fine droplets thoughout the length of the coiled specimens. These were then placed in the incubator having the correct environment and left there for 28 days.

Results:

when removed from the incubator, the samples were examined both grossly and microscopically.

Gross examination showed the presence of large amounts of white flaky deposits, probably a corrosion product which were easily removed. The distribution appeared to be quite even and there were no areas of heavy damage.

Microscopically, these little white flakes appeared as a crystalline type material in the form of small bubbles in some instances. It was not possible to see any evidence of fungal growth near these areas but mycilial remains indicative of fungal growth, could be seen elsewhere.

C-V
ASTRONAUTICS

To: J. D. Lively

Re: Aluminum Jacket R.F. Cable Qualification - Fungi Test
(T.N. 7A 2065)

X-Ray diffraction was run on a sample of these white crystalline appearing flakes. The results showed that they were not entirely crystalline in structure and the interferrence was enough to obscure a clearcut answer.

Prepared By _____
G. J. Goble,
Engineering Chemist
Materials Laboratory
532-5

Approved By Wm. Gross
W. M. Gross,
Group Supervisor
Materials Laboratory
532-5

WMG:GJG:cfs